

# **OCEAN DUMPING—Part 2**

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**JOINT HEARINGS**  
**BEFORE THE**  
**SUBCOMMITTEE ON FISHERIES AND WILDLIFE**  
**CONSERVATION AND THE ENVIRONMENT**  
**AND THE**  
**SUBCOMMITTEE ON OCEANOGRAPHY**  
**OF THE**  
**COMMITTEE ON**  
**MERCHANT MARINE AND FISHERIES**  
**HOUSE OF REPRESENTATIVES**  
**NINETY-FOURTH CONGRESS**  
**SECOND SESSION**  
**ON**  
**OVERSIGHT OF THE MARINE PROTECTION, RESEARCH, AND**  
**SANCTUARIES ACT OF 1972**

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**JANUARY 23, 29, FEBRUARY 27, 1976—WASHINGTON, D.C.**  
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# OCEAN DUMPING

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FRIDAY, JANUARY 23, 1976

HOUSE OF REPRESENTATIVES,  
COMMITTEE ON MERCHANT MARINE AND FISHERIES,  
SUBCOMMITTEE ON OCEANOGRAPHY AND  
SUBCOMMITTEE ON FISHERIES AND  
WILDLIFE CONSERVATION AND THE ENVIRONMENT,  
*Washington, D.C.*

The subcommittees met, pursuant to call, at 10:10 a.m., in room 1334 Longworth House Office Building, Hon. Robert L. Leggett (chairman of the Subcommittee on Fisheries and Wildlife Conservation and the Environment) presiding.

Mr. LEGGETT. The Subcommittee on Fisheries and Wildlife Conservation and the Environment and the Subcommittee on Oceanography will begin oversight and authorization hearings on the Marine Protection, Research and Sanctuaries Act of 1972—commonly known as the Ocean Dumping Act—which has as its purpose to assist in the clean up of our Nation's rivers, estuaries, and coastal waters and to eliminate eventually the ocean dumping of all waste material.

The Ocean Dumping Act vests authority to regulate the ocean dumping of all waste material, other than dredged material, in the Environmental Protection Agency. The Army Corps of Engineers is delegated the responsibility of regulating the disposal of dredged material.

The act calls on the National Oceanic and Atmospheric Administration to fulfill two functions, that of conducting research on the effects of ocean dumping on the marine environment and that of designating certain of our Nation's more valuable and unique waters as marine estuaries, in general where no dumping of waste material would be permitted.

The Coast Guard is called upon to enforce the act by monitoring the actual dumpers as they transport the waste material to sea, and by informing the Environmental Protection Agency and the Attorney General of any violations of the act and any permits issued thereunder.

The act is now more than 3 years old. During this 3-year period, the Federal agencies involved have been able to develop some meaningful statistics on the accomplishments made under the act, which can be measured in terms of the number of dumpers availing themselves of ocean dumping of waste material; in terms of the number of designated dumpsites in use; and in terms of the amount of waste material dumped at sea.

We are also beginning to get results from some of the research that has been conducted on the environmental effects of ocean dumping. And we can measure this progress by the criteria that has been developed to determine which waste material may be safely dumped under certain conditions and which waste material is too dangerous to dispose of casually at sea. We are anxious to hear about all of these activities and about the progress that has been made in implementing the act.

Unfortunately, but probably inevitably, since the inception of this act it has attracted some critics. I say this because the wording of the act was strong and it set high goals to be reached. But some of the criticism is probably justified because of the actions or inactions of the various Federal agencies involved.

The members of these subcommittees have been concerned in particular that the funding has not been adequate for carrying out the act and that efforts to reach the very high goals set by the Congress in 1972 and have not been wholehearted.

Consequently, we are anxious at these hearings to hear from the critics of the program as well as from its supporters. We want to hear about the program's shortcomings and the problems that have been encountered as well as the successes and the progress that have been made.

Before calling the first witness, I might announce at this time that the authorization hearing scheduled for this coming Monday, the 26th, has been postponed until next Thursday, the 29th.

Mr. FORSYTHE. Mr. Chairman, I should like permission to insert an opening statement in the record immediately following yours.

Mr. LEGGETT. Very good.

Your statement will be so included at this point in the record.

[The statement of Mr. Forsythe follows:]

STATEMENT OF HON. EDWIN B. FORSYTHE, A REPRESENTATIVE IN CONGRESS  
FROM THE STATE OF NEW JERSEY

Thank you, Mr. Chairman: Last year during our consideration of funding authorizations for this act, the Environmental Protection Agency could not prove to our satisfaction that the requested reduction in authorizations was justified. Because of the lack of a satisfactory explanation, I sponsored an amendment which was incorporated in the law providing for increasing the authorization for Title I from the requested \$1.26 million to \$5.3 million in fiscal year 1976. In view of the needs of the programs involved, I feel that this substantial increase over EPA's request still represents the minimum authorization necessary to adequately carry out the purposes of this act.

EPA, however, has not seen fit to ask for additional funds by requesting a supplemental appropriation. Yet almost four years after the enactment of this landmark legislation, slight progress appears to have been made in carrying out many of its intentions. I would like to find out, therefore, the reasons underlying this reluctance to request these funds which Congress has authorized.

Additionally, EPA's Region II office in New York recently announced a proposal to consider alternate sewage disposal sites to replace continued dumping in the New York Bight area. Such a proposal would very likely have a serious impact on the water quality off the New Jersey shore, an area which I represent, an impact that would be environmentally and economically disastrous.

There is little logic supporting such a shift in dump sites. If the present dumping site has adversely affected the surrounding area, why should we also destroy another as yet unspoiled area? And just exactly what do we know about the alternate sites? What baseline studies have actually been made? What con-



sideration, for instance, has been given to the fact that all present knowledge indicates that higher pressure and lower temperature decrease the rate of microbial action? That is, the ability of microbial action to "digest" dumped material and thus assimilate it into the environment is severely slowed by dumping in deeper water with correspondingly higher pressure and lower temperatures. In the extreme case, microbial action which normally requires two and a half hours in shallow water might take as long as six and a half months in much deeper water. The shift to the much deeper waters of alternate Area 2-A off the coast of New Jersey, therefore, could create massive problems in turnover of the sludge not presently associated with the shallower New York Bight dumping site.

All these questions must be carefully considered before any decision is made to move forward with such significant changes in present procedures. Nothing presently indicates, however, that such consideration was made before EPA's announcement.

Let me emphasize once more. Last year I took the initiative to authorize the necessary funds for EPA to perform the technical environmental studies necessary to adequately carry out the provisions of this act.

The money was authorized. But it was not requested nor used. Yet the EPA announced the possibility of using the alternate sites. Were the studies conducted somehow with reprogrammed funds? I want to know. If the studies were not conducted, I want to know specifically why EPA is now considering moving the dumping site.

Accordingly, during these hearings, I would like to focus on the broad questions raised as to the overall utilization of the resources made available by Congress. And I would like to focus as well on the specific question as to exactly what decision process led to the proposal to shift dumping to alternate sites. I look forward to receiving useful, detailed answers which will enable us to better evaluate the progress of the programs envisioned by this act.

Mr. LEGGETT. I am sorry to say that our distinguished colleague, the Honorable John M. Murphy, chairman of the Subcommittee on Oceanography, was not able to be with us today.

However, we do have his opening statement that he would have given had he been here, and it shall be included in the record as though given, at this point.

[The statement of Mr. Murphy follows:]

STATEMENT OF HON. JOHN M. MURPHY, A REPRESENTATIVE IN CONGRESS  
FROM THE STATE OF NEW YORK

Today these two subcommittees of the Merchant Marine and Fisheries Committee begin oversight and authorization hearings on the Marine Protection, Research and Sanctuaries Act of 1972, commonly known as the Ocean Dumping Act. This act is part of the overall strategy to clean up the nation's rivers, estuaries and coastal waters. In conjunction with the Federal Water Pollution Control Act, also of 1972, the disposal of all waste materials is regulated in an effort to eliminate or to minimize pollution of the nation's waters by the 1980's.

This act deals specifically with the disposal of wastes into the oceans. It vests authority to regulate the ocean disposal of municipal and industrial wastes in the Environmental Protection Agency. The Army Corps of Engineers is responsible for regulating the disposal of dredged materials. The act also calls for the National Oceanic and Atmospheric Administration to fulfill two important functions. On the one hand NOAA is mandated to conduct research into the effects of ocean dumping on the marine environment, and on the other the act authorizes NOAA to designate certain of the nation's more valuable and unique waters as marine sanctuaries. Finally, the Coast Guard is responsible for enforcing this law, by monitoring the actual dumpers as they transport the wastes to sea, and by informing the environmental protection agency of any violations of the conditions of a dumper's permit.

There are two areas of particular concern to me at these oversight hearings. One is the question of alternatives to ocean disposal that have been and are being studied and tried out. Because the act specifies that the ocean is to be a

dumpsite of last rather than first resort, I think that efforts to find alternatives should be intensified.

The second area of concern is the special problem of the New York Bight. We will be hearing over the next few days about that area and the environmental effects that have been measured in such a zone of massive and intense dumping. And we plan to have another day of hearings in New York City in February to focus specifically on this problem. The New York Bight is far and away the most heavily dumped area in the nation, and I think it is fairly obvious that something must be done about it. Citizens in New York and New Jersey are concerned about the sludge drifting toward their beaches and ruining the natural beauty of the area. And now that they have a law that they can point to, which is supposed to lead to the elimination or at least minimization of ocean disposal, they will not stand for the continued use of waters so close to their shores. There is no reason to put up with dumping in the New York Bight when the law clearly states that alternatives must be sought. We are encouraged by the decision of Administrator Train to force the phasing out of ocean dumping by Philadelphia in 1981, and hope to see a similar phasing out of ocean dumping in the waters of the Bight. If we can start putting a date on the end of dumping in the Bight, then I think some real progress will have been made in the implementation of this act.

Mr. LEGGETT Our first witness this morning will be Mr. Henry Eschwege, Director, Resources and Economic Development Division of the General Accounting Office.

**STATEMENT OF HENRY ESCHWEGE, DIRECTOR, RESOURCES AND ECONOMIC DEVELOPMENT DIVISION, GENERAL ACCOUNTING OFFICE; ACCOMPANIED BY WILBUR D. CAMPBELL, ASSOCIATE DIRECTOR; BRIAN P. CROWLEY, ASSISTANT DIRECTOR; AND PHILIP A. OLSON, SUPERVISORY AUDITOR**

Mr. ESCHWEGE. Thank you very much, Mr. Chairman, and members of the committee.

We welcome the invitation of your subcommittee to discuss the effectiveness of the administration of the Marine Protection, Research, and Sanctuaries Act of 1972, commonly referred to as the "Ocean Dumping" Act.

With me today are Messrs. Wilbur D. Campbell, Associate Director, Brian P. Crowley, Assistant Director, and Philip A. Olson, Supervisory Auditor, of our Resources and Economic Development Division as well as representatives of our Washington and field staffs who participated in the review.

My testimony will summarize the results of our recently completed review on the ocean dumping of sewage sludge and industrial wastes. We were in the process of drafting a report to Congress when we learned of your interest to have us discuss our observations at these hearings.

Accordingly, the responsible agencies have not been given an opportunity to formally comment on our tentative conclusions and proposals for improvement. My testimony will also include some comment on our ongoing review of the dumping of dredged material by the Corps of Engineers.

As you know, a major objective of the act was to prevent or strictly limit the dumping of any material which would adversely affect human health and the marine environment.

The Environmental Protection Agency (EPA), the Corps of Engineers, the Coast Guard, and the Department of Commerce, through the National Oceanic and Atmospheric Administration (NOAA), have major responsibilities for implementing the act.

EPA sets criteria to govern the disposal of wastes to the marine environment and issues permits for the discharge, transportation, and dumping of waste materials except dredged material, for which the Corps of Engineers issue permits on the basis of EPA criteria.

The Coast Guard is responsible for conducting surveillance and enforcement activities to prevent unlawful transportation of wastes and unlawful dumping. The Coast Guard refers apparent violations to EPA for further enforcement action.

NOAA is required to perform research related to the effects of ocean dumping and alternative disposal methods.

From the effective date of the act, April 23, 1973, through June 30, 1975, EPA, Coast Guard, and NOAA have expended about \$3 million, \$500,000, and \$300,000, respectively, for activities carried out under the act. Additional indeterminable amounts of expenditures are incurred for numerous related activities.

#### OCEAN DUMPING OF SEWAGE SLUDGE AND INDUSTRIAL WASTE

The volume of sewage sludge and industrial wastes dumped in ocean waters off the coasts of the United States increased from 9.2 million tons in 1968, to 10.8 million tons in 1973 and 11.4 million tons in 1974. Preliminary EPA figures for 1975 show that the volume decreased to 10.4 million tons. More than 98 percent of the 1975 volume was dumped in the Atlantic Ocean.

There is no dumping of these materials in the Pacific Ocean, although sewage sludge is discharged to the ocean through outfalls in southern California.

Ocean dumping, especially of sewage sludge, is expected to increase. The Federal Water Pollution Control Act Amendments of 1972 require municipal sewage treatment plants to provide a minimum of secondary treatment of their wastewater by July 1, 1977.

As more and more municipalities upgrade their sewage treatment facilities, additional sludge will be generated. EPA estimates that this upgrading of plants will triple the volume of sludge to be disposed of in the ocean by existing dumpers in New York and New Jersey. Furthermore, additional municipalities in other locations are considering the ocean dumping of their sewage sludge.

The volume of industrial waste production is also expected to increase. Given increasingly stringent water quality standards governing industrial discharges into rivers, lakes and streams, and the expanding level of wastes being generated by industry, the potential exists for increased industrial waste dumping at sea.

EPA has promulgated criteria and established a permit program to regulate and control the types and concentrations of wastes dumped into ocean waters. In establishing criteria for assessing permit applications, EPA is to consider the:

- (1) Need for the dumping,
- (2) Effects on health and welfare, shorelines and beaches, and the marine ecosystem and its resources,

- (3) Persistence and permanence of the effects,
- (4) Appropriate locations and methods of disposal, and
- (5) Effects on alternate uses of the ocean.

Since inception of the program, the number of municipal permits has remained about the same, while the number of industrial permits has decreased; the volume of municipal wastes dumped has increased whereas the volume of industrial wastes decreased.

Our review showed that a number of problems in EPA's administration of the permit program are resulting in the dumping of wastes which may be harmful to the marine environment.

#### WASTES EXCEEDING MERCURY AND CADMIUM SAFETY LEVELS ARE BEING DUMPED

EPA has established levels of mercury and cadmium, both of which are highly toxic, which it believes, if exceeded, will degrade the marine environment. The municipal permit holders in New York, northern New Jersey, and the Philadelphia area were dumping sewage sludge containing cadmium or mercury that exceeded from 1 to more than 100 times these safety levels. The practice is occurring because EPA's regulations allow the dumping of mercury or cadmium in excess of safety levels under certain permits if the materials are present in sewage sludge.

Because of this practice, large amounts of mercury and cadmium are being dumped into the ocean. For example, in 1974, EPA estimated that the sewage sludge dumped into the Atlantic contained about 24 tons of cadmium.

Ideally, EPA should not allow the dumping of cadmium and mercury which exceed the safety levels. However, EPA officials informed us that EPA has no choice but to allow the ocean dumping of municipal sludge until alternative disposal methods are found.

Much concern has been expressed that mercury and cadmium are accumulating in the tissues of fish and shellfish. For example, less than 1 year after the Philadelphia dump site was moved in 1973, clams and scallops taken from the areas surrounding the new site had accumulated high levels of cadmium.

#### WASTES ARE BEING DUMPED AT A RATE WHICH MAY BE CAUSING HARM TO THE ENVIRONMENT

Another problem is that wastes are being dumped at too rapid a rate which may be causing harm to the environment. To prevent short-term harm to the environment, EPA utilizes a test (commonly referred to as a bioassay) to establish the rate at which wastes can be dumped, without unduly increasing the toxicity level at the dumping location.

A number of marine scientists have questioned the validity of the tests because brine shrimp is used. This organism is not considered appropriate because:

- (1) It is not a marine organism native to the dump site,
- (2) It is too hardy, and
- (3) Most marine plants and animals would be dead before the brine shrimp showed ill effects. The thought is that a slower rate of dumping should be prescribed.

The high concentration of wastes dumped has caused environmental problems. For example, one study of the New York bight showed that sizeable areas of the sea floor near the sewage dump site were nearly devoid of marine life.

Another study of the bight concluded that abnormally high concentrations of heavy metals, microorganisms and organic materials had resulted in the death of migrating crabs and lobsters.

Preliminary tests by EPA indicate that if appropriate organisms are used, the length of time dumpers would have to remain out at the dumping site would be extended, thereby increasing cost and the risk of collision.

An EPA Region III official estimated that disposal times would double under the revised bioassay procedure. EPA officials agreed that the brine shrimp was not appropriate organism, but stated that dumpers may not be able to fully comply with the extended disposal times if appropriate marine organisms were used.

#### COAST GUARD SURVEILLANCE OF OCEAN DUMPING OPERATIONS HAS BEEN INADEQUATE

We also found problems in the Coast Guard's surveillance of ocean dumping operations at dump sites off the northeastern Atlantic coast of the United States. These sites accounted for 100 percent of the sewage sludge and about 90 percent of the industrial wastes dumped in the Atlantic.

Our review showed that the Coast Guard did not meet its established surveillance goals for fiscal year 1975 in that: (1) Contrary to a goal of boarding 10 percent of ocean dumping vessels prior to departure, no vessels were boarded. (2) Although shipriders were to be assigned to 60 to 100 percent of the vessels going to the toxic chemical waste site, they were only assigned to 7 percent. (3) Finally, only 42, or 1 percent of the dumpings for substances other than toxic chemicals were observed compared to a goal of 10 percent.

Coast Guard officials stated that goals were not being met because of a shortage of personnel and other resources and other missions were considered to have higher priority. They noted also that bad weather sometimes forced the cancellation of surveillance missions.

About one-half of all dumping operations occurred at night. The Coast Guard does not monitor night activities because its surveillance efforts depend primarily on visual observation.

Initially EPA did not permit night dumping. In December 1973 the Coast Guard requested that EPA permit night dumping because the prohibition was severely restricting ocean dumping operations.

When the Coast Guard detects ocean dumping violations, it forwards the cases to EPA for enforcement action. From the beginning of the program through June 30, 1975, the Coast Guard referred 24 cases involving apparent violations to EPA.

Penalties were assessed in two cases, two other cases are still pending, and the remaining 20 cases were closed without assessing penalties because EPA considered that violations were minor or did not occur.

Several factors adversely affect the Coast Guard's ability to detect violations when it observes dumping operations. Each ocean dump-

ing permit specifies the area in which the sewage sludge or industrial wastes are to be dumped, and the allowable rate of dump.

However, most barges discharge waste through outlets that are underneath the water, and the actual discharge is not always observable. In addition, for safety reasons, it is not possible for Coast Guard vessels to get close enough to a barge to determine when the discharge begins and ends.

In this regard, our staff accompanied the Coast Guard on one of its missions, and confirmed that it was difficult to determine the precise starting and ending times of the discharge, the types and concentrations of wastes being dumped, and the rate of the discharge.

EPA has made suggestions to the Coast Guard for improving its surveillance methods; such as, obtaining photographs and taking samples of dumped material. To supplement current methods of surveillance the Coast Guard is testing an electronic ocean dumping surveillance system that is to be installed on ocean dumping vessels by 1978.

#### ALTERNATIVES TO OCEAN DUMPING

The last point I would like to address concerns alternatives to ocean dumping. NOAA is responsible for conducting and coordinating research under the act.

However, the bulk of the research effort currently underway in the area of alternatives, exclusive of dredged material, is being conducted by EPA.

EPA requires the dumpers of sewage sludge and industrial wastes to look for alternatives. Some industrial dumpers have been phased out, and others have established dates by which they plan to phase out, and still others are searching for alternatives.

Various methods which would allow the discontinuation of ocean dumping are being examined, including the modification of manufacturing processes to reduce the volume of wastes produced and the recovery of saleable byproducts from the wastes.

We noted two situations that indicate that the alternatives selected to ocean dumping of industrial wastes may not be environmentally sound.

In one case, several industrial dumpers in Puerto Rico have advised EPA that they plan to discontinue ocean dumping and begin discharging their wastes into a municipal treatment facility when it opens in 1976.

This facility, however, will provide only primary treatment and will not change the nature of these liquid industrial wastes. Thus, wastes currently dumped 42 miles offshore could be discharged only 3,300 feet from shore.

The other case demonstrates that landfill alternatives may also pose environmental problems. An EPA survey of 45 former ocean dumpers disclosed that 29 were landfilling their wastes; 21 of these were using the same landfill. The survey indicated that this landfill was of questionable adequacy. It is located on a river bank, and during periods of high rainfall, parts of the landfill are submerged. At times, wastes can be seen running down the banks into the river. The

survey also suggested that harmful materials were moving into the river by means of the groundwater.

Sewage sludge dumpers are also searching for alternatives although no major sludge dumper has yet phased out. Camden, N.J., has selected incineration as an alternative, and Philadelphia has undertaken a pilot project to demonstrate the operational feasibility of the wet oxidation process.

Communities in the New York—northern New Jersey area which account for more than 80 percent of sludge dumped in the Atlantic are participating in an EPA funded sludge management study administered by the Interstate Sanitation Commission of New York, New Jersey, and Connecticut.

The Commission's report on phase I of the study, issued in June 1975, recommended that pyrolysis, a form of combustion, be adopted as the method of processing sewage sludge, and proposed that a pilot project be undertaken.

In summary, we believe that a number of steps can be taken by EPA and the Coast Guard to improve the administration of the ocean dumping program. EPA should: (1) Use appropriate marine organisms to establish waste discharge rates which will adequately protect the marine environment; and (2) Permit only those alternatives to ocean dumping which are environmentally sound.

The Coast Guard should increase the overall level of ocean dumping surveillance. In this regard, shipriders should be used to monitor night dumping operations.

The Coast Guard should also continue to develop new methods such as electronic surveillance, whereby compliance with permit conditions may be more effectively monitored.

We are currently conducting a review of the environmental effects of the Corps of Engineers' dredging activities.

In fiscal year 1975 the Corps of Engineers dredged about 318 million cubic yards of material from our navigable channels and harbors at a cost of about \$230 million. Of this total, about 93 million cubic yards were disposed of in ocean waters.

Under the Marine Protection, Research and Sanctuaries Act of 1972 the Corps of Engineers administers a permit program over the transportation of dredged material for dumping in ocean waters.

The Secretary of the Army determines whether dredged material is acceptable for disposal in ocean waters under criteria developed by EPA in October 1973.

The primary objective of our review is to determine the environmental and economic considerations and problems in disposing of materials dredged from the Nation's waterways and the actions being taken to resolve or mitigate such problems.

We reviewed the corps' disposal in the New York bight of most of the material dredged from the New York Harbor. The bight has been used for the disposal of dredged materials for over 30 years. Because of concerns that the materials dumped in the bight might jeopardize the quality of the water near the beach areas of New York and New Jersey, EPA asked the corps to plan for relocating its disposal site to an area about 65 nautical miles from the harbor.

The corps has taken the position that, in view of the substantial costs involved, the disposal site should not be moved unless it can be shown that dumping at the present site results in major adverse effects.

The long-term environmental effects of dredging are still not fully known. The corps is conducting a major research program on dredging but the program will not be completed until fiscal year 1978.

EPA and the corps need to work more closely together in evaluating the environmental effects of dredging. We plan to address this issue more fully in a report to the Congress.

Mr. Chairman, this completes my prepared statement. We will be glad to respond to your questions.

Thank you.

Mr. LEGGETT. Thank you very much.

I think we are familiar, at least, in the West, with the Corps of Engineers and the EPA activities.

I just had some exchange of correspondence with both the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and the Corps of Engineers, respecting their testing in San Francisco Bay, and some preliminary results from the corps' Vicksburg experimentation.

There are a lot of folks that have a feeling that dredging, for example, is harmful. It is sometimes biologically difficult to prove otherwise.

Once you do prove that it is sometimes biologically difficult, to solve it is financially almost an imponderable, considering our current budgetary restraints, but I would hope that once we can arrive at the point where we have established the harm to be guarded against, that appropriate agencies in Government could unite together to seek appropriate funds, and to try to achieve adequate priorities in the budget for the funds, so that the harm could be reasonably corrected.

Of course, when we allow a budget of \$3 million for EPA and \$500,000 for Coast Guard, and \$300,000 for NOAA to assess the nature and extent of this problem, it is hardly what you would call a complete commitment to resolve this situation.

How do you assess that situation?

Are we spending enough to assess the nature of the problem?

Obviously, you have left that out of the Corps of Engineers' expenditures.

I know they are expending, I think, the bulk of the money in this general subject matter at Vicksburg.

Mr. ESCHWEGE. The corps, as we know, has a 5-year research program which is to expend \$30 million.

We are really not as far along in that particular review to have any view as to whether that is enough or not, and I am not sure we can come to a conclusion at the end of the review, as to whether that is enough.

It certainly is a good effort, I think, to at least identify the problems with the dredging.

I agree fully with what you said earlier, that some of these problems are very, very difficult to resolve, even given the funds that the corps might think are necessary to perform its role.



Mr. LEGGETT. We have the situation where the Fish and Wildlife Service thinks there are problems.

The National Marine Fisheries Service, I am sure, feels the same way. The Marine Fisheries Service has a \$300,000 budget, and I just looked at the Fish and Wildlife budget, and it shows overall degradation for fiscal year 1977, as opposed to 1976, in its overall function when you consider the effect of inflation on the budget.

I think that we do have a particular problem.

However, let me ask you this.

You indicate that in your conclusions that we need more electronic surveillance of the nature of this discharge.

Have you determined that the electronic surveillance is such that it really can produce a reasonable monitor on the nature and quality of material discharged, or does it look for metallic materials that might show up?

Mr. ESCHWEGE. The answer to that is no, we have not determined it. The electronic surveillance devices they presently have cannot monitor the nature and quality of material discharged nor can the devices note the types and concentrations of metallic materials discharged.

I am not sure that the Coast Guard even is fully convinced yet that these electronic devices will solve all of their problems. They are really in a kind of a research and demonstration effort, and hopefully by 1978, they say they will have more of these devices onboard vessels, and they will have better surveillance.

Mr. LEGGETT. The conclusion is that we need more electronics, which is kind of preparatory, and hopefully, that it might do something, but we do not precisely know.

Mr. ESCHWEGE. That is correct, but we know some of the shortcomings now which prevent humans from actually spotting discharges, exactly knowing when they are made, and in what quantities they are being made.

Mr. LEGGETT. Now, the other thing you say is we ought to have more Coast Guard personnel on these boats, and observers, and also you say once they are on there they really do not see too much.

I would presume that part of the lack of zeal on the part of the Coast Guard in participating in the observer program is that the Coast Guard has advised us they have personnel limitations and their efforts in respect to enforcing fishery laws in the Alaska area allow them really only to enforce the laws 5 percent of the time, that is to say, 95 percent of the time violations go undetected. They have no capability whatever to monitor that.

Mr. ESCHWEGE. I would just like to clarify our statement on that.

What are we saying, Mr. Chairman, is that if the Coast Guard could board more of these vessels, they could make some inspections, such as seeing the type of materials on board, and they could, once they are onboard, find out when they start dumping this material, and in what area.

Mr. LEGGETT. It is your thought they can do that within the framework of their existing budget?

Mr. ESCHWEGE. This is a matter of allocating their resources. They claim they have higher priority functions which need first attention, such as the transportation of hazardous materials, et cetera.

We have not evaluated these other programs to be able to say which has a higher priority. We think this one is a high priority, but there are also search and rescue missions which are of a higher priority.

What I am saying, in effect, is I believe they probably could stand more funding.

Mr. LEGGETT. Have you come to any conclusion in your report as to the amount of funding that would be needed for the Coast Guard to satisfy, to a reasonable degree, the mission you outline in your report.

Mr. ESCHWEGE. Well, we do not come to any conclusion on that in our statement.

Mr. Chairman, we are going to give it some thought when we finalize our report, which is in the works.

Mr. LEGGETT. That would be very helpful to this committee.

Mr. Forsythe?

Mr. FORSYTHE. Thank you very much, Mr. Chairman.

Mr. Eschwege, on page 2 of your statement, where you discuss the money spent by NOAA, et cetera, we understand that NOAA is re-programing something like \$500 million in funds.

Is that considered in your look at their efforts?

Mr. ESCHWEGE. Sir, I do not quite follow you.

Mr. FORSYTHE. NOAA has reprogramed something in the area of \$500,000.

I am assuming that would be in addition to this \$300,000.

Mr. ESCHWEGE. I think that is right; yes.

Mr. FORSYTHE. Where is that going?

Mr. OLSON. I would like to speak on that.

Basically, the \$300,000 relates to activities of NOAA to carry out its responsibilities under title II of the act. There is a lot of work that NOAA is involved in which encompass certain aspects of ocean dumping as well as other programs, but the ocean-dumping portion of these programs could not be broken out.

Mr. FORSYTHE. They really are not bringing in these others. These others are basic research projects.

Mr. OLSON. Yes; they conduct various types of research, but not specifically geared to ocean dumping.

Mr. ESCHWEGE. What we are saying is: There is no line item in the budget that specifically identifies an amount that NOAA is to expend for this ocean dumping act.

Mr. FORSYTHE. Have you considered, or will you, in your final report, the dollars spent for research as compared to the dollars expended for enforcement and surveillance.

Would dollars spent in research get us to a point where you do not have to try and enforce ocean dumping?

Mr. ESCHWEGE. Well, you raise really two questions, Mr. Forsythe.

The first one I do not think we will be in a position to tell you how much more research should be performed, and how much funding should be done for it.

A lot of this research, especially for industrial wastes, is done by industry.

In the case of sewage, yes; the Federal Government has a large role in that, and Mr. Crowley is making another review, separate and apart from this, because sewage-sludge is such a big problem.

We do not think we would come to a conclusion, except to say that a lot more needs to be done in this area. Certainly, more needs to be done to find alternatives to ocean dumping and to find other ways of utilizing these wastes.

Mr. FORSYTHE. Well, the Chairman suggests that on the west coast they have problems, but somewhere around 90 percent of the problem is here on the east coast.

The great bulk of that is the sewage-sludge problem, rather than industrial wastes.

Mr. ESCHWEGE. That is correct.

Mr. FORSYTHE. And the fact that we continue to go up so far as the future is concerned in sewage-sludge gives me concern particularly if we are spending our money on enforcement and not on alternatives. In that case, we have a no-win situation.

Mr. CAMPBELL. It is interesting to note that although EPA has ordered Philadelphia to stop all dumping by 1981, it is fairly certain that the New York area will not end dumping by 1981. Conceivably, if we stop the dumping of sewage sludge, it would eliminate some of the need for research and development. The most preferable approach would be to find alternative solutions.

Mr. FORSYTHE. Do you believe there are available solutions so that even Philadelphia could meet a 1981 date?

Mr. CAMPBELL. Philadelphia is considering seriously about six different approaches which might allow it to stop dumping by 1981.

Mr. FORSYTHE. You mention one here.

Mr. CAMPBELL. Yes, wet oxidation, and they are considering land-fill applications, public giveaway programs, and pyrolysis. They are also considering the possibility of filling strip mines with sewage-sludge.

They are considering a lot of options.

Mr. FORSYTHE. There is a problem with that.

On page 4 is a statement that the EPA is setting far higher dumping standards for rivers and streams, than they are on the ocean, so it is kind of a game to clean up the streams, but dump it all in the ocean.

Is there any validity in that statement, or is it a priority thing, where we can clean up the streams by the Water Control Act, but just leave open the kind of issue of open dumping.

Mr. ESCHWEGE. I think we point out in our statement that they are trying to clean up the rivers by requiring waste treatment plants to provide secondary treatment. The result is that more sludge has to be disposed of, and in the next few years it looks like it may have to go into the ocean.

We are saying, in effect, that an increase in the ocean dumping of sewage sludge is very likely.

Mr. CAMPBELL. By cleaning up the waterways, the rivers and streams, we are creating large amounts of pollution that could ultimately find their way into the sea.

Mr. FORSYTHE. We are not solving anything. We are just moving it around.

Mr. CAMPBELL. Yes; to some extent.

Mr. FORSYTHE. That is kind of a frustrating situation.

Again, on page 4, the first paragraph, you say the potential exists for increased waste dumping at sea. That bothers me, particularly when you point out in the third paragraph that the volume of industrial wastes has decreased.

You are going to lose that decrease and then go to an increase.

Mr. CROWLEY. That statement was made by the Council on Environmental Quality a few years ago. The main point was that, with more and more stringent treatment requirements being placed on industries, they will have to do something with their wastes. Therefore, the potential exists that these wastes could be dumped into the ocean.

Since passage of the Ocean Dumping Act, the number of industrial dumpers has been reduced.

Mr. FORSYTHE. Well, it still seems contradictory.

We have reduced it, but you imply that it is going to increase again.

Mr. CROWLEY. We do not know for sure, sir. We have very stringent effluent standards that are going to be mandatory by 1977.

We have even more stringent effluent standards that are going to be required by 1983.

What we are going to do with the wastes is still not certain.

Mr. FORSYTHE. This is also saying then the EPA criteria for disposal of industrial wastes has holes in it. It is going to let it go to the ocean.

Mr. CROWLEY. We do not know whether EPA will let it go.

What we are pointing out is that the volume of waste material is going to increase, and we have to plan for it.

Mr. FORSYTHE. I see.

I do come back to this question of research on alternatives disposal methods.

You are reporting that Philadelphia has considered more than the one you have mentioned here.

Are any of these along to the point where there is, in your view, any feeling that we are coming to some answers?

Mr. CROWLEY. Including wet oxidation, they have looked at 18 different alternatives to some extent. Some they just looked at and rejected immediately, but the wet oxidation process right now is still in the pilot stage, and they have not concluded that this process is the answer.

Mr. FORSYTHE. How about the Camden burning consideration process?

Mr. OLSON. We have not looked into the effectiveness of it.

We are aware that incineration is one method by which they are going to reduce the amount of sludge. We have not tried to evaluate the effectiveness of any of the alternative methods and, basically, the pyrolysis method and the wet oxidation methods are very new, with respect to handling sewage sludge and are being tested now to determine their feasibility.

With respect to the New York situation, it will take probably 10 years before the pyrolysis system becomes operational. In discussing this matter with the Environmental Protection people, there are a lot of areas where further research might still have to be done.

It is not clear cut that they will solve the problem by using that method.

Mr. CROWLEY. I think Mr. Eschwege mentioned that there are many alternatives that are being considered by EPA and not just the alternatives applicable to New York and Philadelphia.

Mr. FORSYTHE. I guess my end comment on this would be it would certainly seem that we have not had enough effort going into research to find alternatives.

Thank you, Mr. Chairman.

I thank you, gentlemen.

Mr. LEGGETT. Thank you, Mr. Forsythe.

Mr. Bauman?

Mr. BAUMAN. Mr. Eschwege, I want to thank you for a very comprehensive statement, and I think probably your detached viewpoint is far more helpful than we receive from the EPA witnesses when they come before this committee with their statements.

Do you think we can conclude properly, from what you told us in your statement, that the EPA is in violation of Federal law in what they are doing in regards to ocean dumping?

Mr. ESCHWEGE. Not being a lawyer, I better not render a legal decision here today, sir.

Implementation of their waste criteria has not, as we pointed out, minimized the dumping of toxic materials.

Mr. Crowley, you might want to add to that.

Mr. CROWLEY. They have a problem with the dumping of sewage which has concentrations of cadmium and mercury exceeding safety sludge levels established by EPA.

We have a problem too in that wastes are being dumped too quickly. But to get back to your question on legality, I am not a lawyer either, but I do know that the law says that EPA is to regulate dumping, and the regulations say that EPA is supposed to use an appropriate sensitive marine organism to determine the rate of dumping. The organism they are using is not appropriate. It is the brine shrimp.

Mr. BAUMAN. You also point out in your testimony that in given instances the exceeding of levels that EPA itself has set in cadmium and mercury, exceeded from one to 100 times the levels they have already set, presumably by regulation, which has the force and effect of law.

Mr. ESCHWEGE. They claim, however, they have no alternative.

It has to be dumped somewhere.

That, sir, is their decision.

Mr. BAUMAN. I can imagine what would happen in the Antitrust Division in Justice if Chrysler and Ford said they they had no alternative but to merge.

Passing on to another point, did you find that the EPA, generally speaking, has used any of its powers to try and ameliorate the types of sludge that is being taken out to the ocean, for instance?

Camden, as I understand it, had a faulty system of sewage disposal for some years, and when their disposal system in the city has declined in its plant capacity, instead of repairing it, they have turned to dumping almost raw sewage into the ocean.

Is the EPA acting in any particular instance to try to force them to rebuild these plants, or to take some steps that would at least mean the sludge is treated to a higher degree?

Mr. CROWLEY. When EPA has issued permits for dumping, it has required municipalities to look into alternatives to try to solve this problem.

It is the same thing, Mr. Bauman, with industrial wastes. EPA has required industry to find alternatives to disposal at sea.

Mr. BAUMAN. In the instance of Camden, have any specific requirements been placed upon their treatment plants?

Mr. OLSON. I don't know. Camden is going to use incineration for some of its wastes.

Mr. ESCHWEGE. The question was whether the EPA was instrumental in getting the city of Camden to go to that alternative.

Mr. OLSON. From everything that I have learned from agency people, they have tried very hard to come up with other alternatives.

Since the inception of the program there have not been very many people who have received permits to dump who were not already dumping at the time the act was passed.

I think EPA is trying to reduce dumping. They have a real problem here with respect to the levels of mercury and cadmium that are being dumped.

Until alternative solutions are found they have almost no recourse but to continue to allow it to be dumped into the ocean.

Mr. BAUMAN. Is this the issue, alternative disposal method?

Of course, the State of Maryland, under court edict, was forced at Blue Plains to dispose of its sludge product at that particular site by alternate methods, other than discharging it into the Potomac, and they have accomplished that in a rather short time by enforcing the court's order.

If it can be done in one area, why cannot it be done in others, that is, by trenching and composting?

Mr. OLSON. I think if you talk to the EPA people they are going to take the position that there are many alternatives.

You can put sludge in landfill, trench it, et cetera, but they are looking for the alternative which results in the largest environmental gain.

While EPA has established safety levels for the amounts of mercury and cadmium that can be introduced into the ocean, there are no such levels. I understand, with respect to the amounts that can be placed on land.

EPA is trying to get information on the effects of putting these metals on land as opposed to other forms of disposal.

Mr. BAUMAN. Did you find, in conducting your study, that EPA has formed any baseline judgment, any baseline studies for a new dump site when they chose, a few years ago, for the disposal area of Philadelphia, to move away from the Delaware Bay to an area now adjacent to Ocean City, Md.?

It is my understanding that they made no tests on the bottom which can now be used as a benchmark against any deterioration that occurs.

Mr. OLSON. That is true. This is a problem which has surfaced within EPA.

They are currently conducting four baseline studies and they plan to conduct baseline surveys on the other sites to determine what the condition of the water is, so when they add various elements to the water they can know what the effects will be.

At present, they do not know how many pounds of mercury, or cadmium, et cetera, can be safely added to the ocean. They just do not know this information, and until they do have this type of information they are still going to be in the position of truly not being able to regulate the program properly.

Mr. BAUMAN. So they are, in essence, permitting a disposal method the effect of which they have no knowledge of?

Mr. OLSON. Well, their criteria says if you are exceeding these limits you are causing harm. Although you are causing some harm, what are the alternatives?

EPA's problem is that if it is put on land, will it cause harm there, too? They do not know at this time which is the best method.

Mr. BAUMAN. One last question.

Did you find in your study instances where ocean dumping that EPA has permitted constitutes a threat to public health?

I ask this question because because the testimony earlier this week, by assistant attorney general of Maryland, Mr. Rich, at Rehobeth, at one of the EPA hearings, which was a pretty much foregone conclusion, they are, as far as he knows, because they announced they are going to continue dumping through 1981, but they go through the procedure, and he said he found metal and viruses, and I was told by EPA earlier this week, for the first time in the last 6 months they have found measurable quantities of toxic materials on the ocean bottom in this area that they had been using for the first time, and yet, of course, they said they had no baseline with which to compare it, but now they are able to measure these.

Mr. LEGGETT. Where was that area?

Mr. BAUMAN. In the City of Philadelphia disposal area, off the coast of Maryland and Delaware.

Have you found any threat to the public health?

Mr. OLSON. Let me answer it this way. Any time you dump sewage there is going to be a threat to the public health to some degree, especially with respect to shellfish becoming contaminated.

The question is whether or not this material is moving closer to shore where more bathers have access to the water. We really did not look closely into whether dumping affects the beaches.

Initially, Dr. Harris, from Brooklyn said globs of sludge are coming on shore, and everyone pretty much got excited. NOAA went in to look at the matter.

As it turned out, it is not that severe, but you get many studies, going back and forth on what the situation really is. I think you can always get studies of some kind to support that there is going to be some degree of harm to the beaches.

Mr. CAMPBELL. There seems to be a lack of knowledge as to what the long term effect is going to be.

There is a lot of research going on, but as far as we can determine, not much concrete evidence either way.

Mr. ESCHWEGE. We do point out in our testimony an example where less than 1 year after the Philadelphia dump site was moved in 1973, clams and scallops, taken from the area surrounding the new site, had accumulated high levels of cadmium.

This is the kind of material that we gather by talking to the Environmental Protection Agency and other groups, such as the National Academy of Sciences, which are doing this technical evaluation. There are bound to be some other examples like that which you might want to question EPA about.

Mr. BAUMAN. But there are studies that do definitely assert the safe levels have been passed?

Mr. ESCHWEGE. Yes.

Mr. BAUMAN. And on good authority, and yet, the EPA continues to say that they do not have information to form a judgment.

Is that not just a convenience, to permit this, because of the difficulties they have in disposing of it by other means?

Mr. ESCHWEGE. This is something that I think EPA will have to answer, sir.

Mr. BAUMAN. Very good.

Thank you, Mr. Chairman.

Mr. LEGGETT. Thank you very much, Mr. Bauman.

I am looking at an analysis made by Mr. Mannina of our staff, and it appears that we authorized under the Ocean Dumping Act, \$3.6 million in 1973 for EPA under Title I; \$6 million for NOAA under Title II for research; and \$10 million for NOAA under Title III for designating marine sanctuaries. This comes to about \$20 million a year for 1973, 1974, 1975, 1976, and 1977, for a total of about \$100 million that has been authorized for these 5 years.

On the other hand, it appears that we appropriated only about \$290,000 in 1974; \$1.3 million in 1974; \$1.2 million in 1975; and \$1.3 million in 1976, and \$2.3 million in 1977 for a total of about \$6 million.

It appears that the appropriations process does not appear to be tracking at all with the authorization program or what we had in mind.

We can blame these agencies for not complying with the act, which is easy enough to do, but they have not been getting the money with which to do the job.

Section 102 of the act provides that the Administrator of EPA may, after opportunity for public hearings, permit ocean dumping, if it is determined according to criteria established by the Administrator that such dumping will not not reasonably degrade or endanger human health, the marine environment, or the economic potential of the dump site.

It goes on to say that in establishing such criteria the Administrator is directed to consider the need for the proposed dumping, the effect of such dumping on human health and welfare, the effect on fishing resources, the effect on marine ecosystems, the suitability of alternatives, the effect of dumping on alternative uses of the ocean, and such other factors as the Administrator deems appropriate.

That act, has been in effect now for 4 or 5 years, and naturally we have to allow for a get ready time, but the practical matter is you



necessarily have to conclude from what has been said here, and the observations of the committee members, and particularly from our analysis today that really the act is not being carried out, and the responsibility, I would assume, lies not only with the agencies, but also with the Congress, with industry, with people, and with the right to live group.

Now, what do you recommend we do? We are drowning in sludge. We have set these huge, high standards.

You have spent so many man-months of study determining that we are not doing what we said we set out to do, and we appreciate your advising us that we are not carrying out the law.

Again, what do you recommend we do?

Mr. ESCHWEGE. Mr. Chairman, I believe that is exactly our mission, to bring some of these problems to your attention. Committees such as this hopefully can then act upon these matters.

Mr. LEGGETT. Very good.

Mr. PERIAN?

Mr. PERIAN. Congressman Murphy has a list of questions that I would like to submit to the gentlemen for their response later by mail.

Mr. LEGGETT. Give them the questions, and they can supply the answers for the record later.

[The following was received:]

#### QUESTIONS OF MR. MURPHY AND ANSWERS THERETO

*Question 1.* Is GAO conducting two studies, one on municipal and industrial wastes and one on dredged materials?

Answer. Yes, we are conducting two reviews: one on the progress toward controlling and eliminating the dumping of municipal and industrial waste into the ocean and the other on the environmental effects of the Corps of Engineers' dredging activities.

*Question 2.* Who requested these studies?

Answer. Both studies were self initiated by GAO.

*Question 3.* What are your sources? Printed materials, interviews?

Answer. Our sources included both printed materials and interviews. We discussed the dumping of municipal and industrial wastes with Federal officials at EPA and Coast Guard Headquarters in Washington, D.C.; at EPA regional offices in New York and Philadelphia; and at various units of the Third Coast Guard District. We also talked to officials of State environment agencies in New York and New Jersey; municipal sewerage authorities; and industrial firms engaged in ocean dumping.

We reviewed several studies of the effects of ocean dumping of sewage sludge and industrial wastes prepared by such organizations as the National Academy of Sciences and the Council on Environmental Quality.

We discussed dredging operations with Corps officials at several Corps districts and with officials at EPA, Department of the Interior, NOAA, Council on Environmental Quality, and the Water Resources Council.

In addition, we contacted officials of port authorities, and water quality representatives of the States of Alabama, Florida, California, Minnesota, and Wisconsin.

In both reviews, we reviewed applicable legislation and regulations, documents, reports, records and files.

*Question 4.* Could you explain further how it is that EPA allows the dumping of toxic levels of mercury and cadmium?

Answer. Sections 220.3(d) and 227.22(f) of the Ocean Dumping Regulations specify the levels of mercury and cadmium which can be dumped into the ocean without causing measurable damage. Section 220.3(d) of the Regulations, however, allows mercury and cadmium to be discharged into the ocean in excess of

these levels if they are contained in materials as trace contaminants. According to section 227.22(e), mercury and cadmium will be considered as trace contaminants when they are present in sewage sludge, dredged material, or in wastes from industries which do not use or produce the materials.

**Question 5.** If the levels of cadmium and mercury exceed the safety levels, who is at fault—EPA for not setting strict enough criteria or the dumpers for violating the conditions of their permits?

**Answer.** EPA's permit conditions allow the dumpers to exceed the safety levels. EPA contends, however, that it has to allow these safety levels to be exceeded until viable alternatives are found.

**Question 6.** You state that EPA claims to have no choice in allowing the dumping of municipal wastes until alternative disposal methods are found. Is EPA looking for alternatives to ocean disposal? Are its efforts adequate in your opinion?

**Answer.** EPA is investigating a number of different alternatives such as land-filling, composting, wet oxidation, and pyrolysis. EPA's search for alternatives to ocean dumping, however, is part of its overall search for ways to dispose of the increasing amounts of sludge resulting from increased waste treatment by municipalities. In our opinion, EPA will not be able to administer the program effectively until it obtains better information on the various alternatives that might be used in lieu of ocean dumping.

**Question 7.** Could you expand on the implications of finding high levels of cadmium in clams and scallops in the vicinity of the new Philadelphia dumpsite? Does this present a very real danger to the shellfish? To man?

**Answer.** Heavy metals can kill, or produce sublethal effects, in marine animals and, if ingested, pose a health danger to man. The example of the clams and shellfish was only one of several studies which show the seriousness of heavy metals contamination. High levels of cadmium were attained in a relatively brief period and were present in a relatively large area. These levels will probably continue to increase if dumping of sewage sludge continues.

**Question 8.** What do you mean when you say that brine shrimp is not a marine organism? Does that just mean it lives in inland waters rather than the ocean? What difference does this particular fact make in the effectiveness of this test?

**Answer.** The brine shrimp is not a marine organism native to the dump sites. The brine shrimp is very hardy and not sensitive enough to measure the harmful effects of wastes dumped. Permits issued on the basis of a test using this marine organism allows the dumping of wastes at a high concentration, thereby causing harm to the marine environment.

**Question 9.** In the New York Bight, you state that one study showed that sizeable areas of the sea floor are nearly devoid of marine life. Now in your opinion, would it be preferable to begin dumping at another site and damaging a relatively healthy environment or to continue dumping at the present site where little additional harm can be done?

**Answer.** In a March, 1975 report, NOAA concluded that "Available evidence does not indicate any environmental advantages which might result from moving the [present] sludge site. Temporary utilization of a new site is likely to result in more harm than good." NOAA agreed that additional study was needed to determine the probable level of contamination from dumping the larger future quantities of sludge at either the present site or alternate sites once they are selected.

Also, EPA plans to release an environmental impact statement regarding relocation of the present sewage site. We believe that the site should be moved only if the new information developed by EPA adequately demonstrates that such a move is environmentally sound.

**Question 10.** If dumpers stayed out at the dumpsite longer in order to dump at a slower rate, would there really be a risk of collisions as the EPA study indicated? How many dumpers go to a site in a given day? And how big is the site?

**Answer.** EPA officials stated that the Coast Guard wanted dumping operations completed quickly because longer dump times may create navigational hazards. Four of the dump sites in the New York Bight area are in the approach shipping lanes to the New York harbor.

We do not have specific information on how many dumpers go to a site in a given day. During fiscal year 1975 there were 5,834 reported dumps at the four non-toxic dump sites in the New York Bight area or about 16 a day. Each dump site covers about 2 square miles.

**Question 11.** You mention the Coast Guard's surveillance goals. Are those self-set goals or have they been set by someone else?

**Answer.** The surveillance goals were established by the Coast Guard.

**Question 12.** Why was it that the Coast Guard asked to allow night dumping? What was their interest in allowing it?

**Answer.** In a December 1973, memo to EPA Region II, the Coast Guard asked that night dumping be allowed because monitoring methods were available. The memo, however, failed to identify what these methods were.

This Coast Guard request resulted primarily because of objections to the night dumping ban raised by the dumpers.

**Question 13.** Do you think that the search for alternatives to ocean dumping should be a job for the government? Or should the government just tell industry to find alternatives and let them do the research?

**Answer.** The search for alternatives to ocean dumping should be a job for both government and industry. Under certain situations, industry is in a much better position to develop alternatives. Because of its technical knowledge regarding its own processes, industry should be better able to modify its processes to reduce the amount of wastes produced.

The Government is in a position to help industry by serving as a focal point for disseminating available information which might solve some of industry's waste disposal problems.

**Question 14.** You cite two cases where alternatives to ocean dumping might not be environmentally sound. What is EPA doing about these two particular cases?

**Answer.** EPA's Region II is currently looking into the situation involving industrial dumpers in Puerto Rico. According to EPA officials, a discharge permit will not be issued to the Puerto Rico Aqueduct and Sewer Authority Barceloneta regional system if it discharges a mix of municipal and industrial wastes which violates either water quality standards or Section 403 of the Federal Water Pollution Control Act Amendments of 1972.

In the second case involving the former ocean dumpers now landfilling we learned that these industrial firms will probably continue to use this alternative. According to EPA, disposals to landfills come under the jurisdiction of the States.

**Question 15.** Can you explain the wet oxidation process to us briefly? Can you explain pyrolysis to us?

**Answer.** In the wet oxidation process, sludge is injected with air at high temperatures and high pressure, resulting in a substantial reduction of organic matter. The gas produced by the process contains very little residual pollution except for odor which can be removed by an afterburner. The residue can be landfilled.

Pyrolysis is the process of decomposing organic matter by heating in an oxygen free environment. The process has had a long history in coke and charcoal production, while its use for processing solid waste and sludge has been attempted only within the past 10 years.

**Question 16.** Isn't the Coast Guard already making progress in the development of electronic surveillance equipment such as you recommend?

**Answer.** The Coast Guard is making some progress in the development of electronic surveillance equipment. One device is being tested in the New York City area aboard a tug boat and a self-propelled barge. Although the device should be useful for documenting the route a dumping vessel takes, it can not document (1) when the dumping commences, (2) the rate at which the dumping took place, or (3) the constituency of the waste being dumped. Coast Guard officials informed us that the device would only supplement current surveillance activities.

**Question 17.** Isn't the Army Corps of Engineers' stand—that dumping should not be halted unless major adverse effects result—in violation of the Ocean Dumping Act?

**Answer.** Congress wanted EPA to consider the potential effect that a permit denial would have on navigation, economic and industrial development, and foreign and domestic commerce of the United States. However, while the Act continued to give the Corps responsibility for issuing the permits, Congress recognized that the Corps' permit program for controlling ocean dumping had not worked, mainly because of lack of standards. Thus, a determination of

whether the Corps' stand violates the Ocean Dumping Act would have to involve a consideration of what practical, commercial, or economic and industrial development effects are being taken into consideration by the Corps as well as the adverse effects on the marine environment.

It has long been GAO's policy not to comment on issues in litigation, but rather, await the outcome of the litigation. Therefore, in view of the complexity of the problem as indicated above, and since we understand the dumping criteria issue is currently being challenged in court by the National Wildlife Federation, we do not believe it is appropriate for GAO to comment further on this issue at this time.

**Question 18.** When do you plan to make these reports available?

**Answer.** The report on progress toward controlling and eliminating municipal and industrial wastes should be issued to the Congress in June 1976. We plan to issue our report on the environmental effects of the Corps of Engineers' dredging activities in July 1976.

**Mr. PERIAN.** I would like to ask about the New York Bight.

You said that a study on the New York Bight showed that sizable areas of the sea floor are nearly devoid of marine life.

Congressman Murphy did an onsite inspection, and he found it was totally devoid of marine life.

In your opinion, would it be preferable to begin dumping at another site, and damage a relatively healthy environment or continue dumping at the present site, where little additional damage would be done?

**Mr. OLSON.** It was my understanding that NOAA recommended that the site not be moved. Until additional information dictates that the site should be moved, I think we would have to agree with NOAA's position.

**Mr. PERIAN.** Well, in reference to the bight, you say if the dumper stayed out in order to dump at a slower rate, there would be a risk of collision, as indicated by the EPA study.

How many dumpers go out to a site on a given day?

**Mr. OLSON.** I am not familiar with the number.

The city of New York has three self-propelled vessels that go out around the clock. This issue was discussed with the Coast Guard and, according to them, the dumping sites in the bight are very close to the traffic lane of ships coming to and from New York City. If EPA requires the ships to comply with a limiting permissible concentration using an appropriate sensitive marine organism, the amount of time is going to be extended.

We came across one permit which is to be written by EPA in February 1976, using an appropriate sensitive marine organism. It relates, however, to the toxic dump site, the 106-mile site, where the dumper is presently dumping over a 5-hour period. Using the appropriate organism it will have to dump over a 40-hour period.

There is this possibility that dumpers will be out there for extensive periods of time in order to comply with the limiting permissible concentrations using appropriate sensitive marine organisms.

**Mr. PERIAN.** The actual number of vessels are three?

**Mr. OLSON.** New York City has at least three self-propelled vessels dumping around the clock.

There are many more vessels other than New York City vessels which are going out there and dumping, plus you have the Corps of Engineers vessels, which are dumping in the same general area.

Mr. CAMPBELL. Apart from the number of vessels, I think there were approximately 5,800 dumpings in this area during fiscal year 1975.

You have asked how many dumpings there were on a daily basis. We do not have that kind of data, but over the course of the year, there were 5,800 separate trips.

Mr. PERIAN. Do you know approximately what size area this covers, vis-a-vis the New York Bight?

Mr. OLSON. The New York Bight covers 15,000 square miles and includes a number of different dumping sites.

I am not certain of the actual area of each site.

Mr. PERIAN. Thank you.

Mr. LEGGETT. Mr. Smith, you have some questions that will be submitted to the witnesses, and the answers will be provided later for the record.

[The following was received:]

QUESTIONS OF MR. SMITH AND ANSWERED BY MR. ESCHWEDGE

*Question.* Given the high costs related to conducting proper research programs to determine the harmful effects of ocean dumping, and considering the fact that only one to two million dollars have been appropriated for the administration and monitoring of ocean dumping—do you feel that Federal funds might be better spent to look for alternatives to ocean disposal of wastes?

*Answer.* If our objective is to phase out all ocean dumping as quickly as possible, then Federal funds might be better spent looking for alternatives to ocean dumping. EPA, on the other hand, has stated that there may be circumstances where ocean dumping of certain wastes may cause no harm to the ocean or may be the most environmentally acceptable solution to a disposal problem. In those circumstances, additional research would have to be done to fully evaluate the short and long-term effects ocean dumping has on the marine environment.

*Question.* In the course of your investigations into the administration of the Marine Protection, Research, and Sanctuaries Act of 1972, did you get the impression from field researchers and administrators that there was a sufficient Federal effort being made to adequately comply with the "Ocean Dumping Act"? Did you learn of any specific complaints leveled against any of the responsible agencies? Would you list some of these complaints?

*Answer.* During our review, we learned of several complaints leveled against the responsible agencies. After examining into these complaints, we found that some had merit. The major complaints are discussed in our prepared statement. For example, EPA is allowing the dumping of harmful materials in excess of safety levels. Also, the Coast Guard's surveillance efforts have not been adequate.

*Question.* In your discussions with EPA, USCG, the Corps, and NOAA, did you feel that there was a clear understanding of the delineation of responsibilities between each of the respective agencies? Do you feel that the Marine Protection, Research and Sanctuaries Act of 1972 is clear enough to allow the various agencies to perform their respective functions?

*Answer.* From our discussions with officials of EPA, Coast Guard, the Corps and NOAA, we felt that these officials had a clear understanding of their various responsibilities. There is some question, however, about the need for section 203 of the act which authorizes NOAA to assist and promote the coordination of research and other activities for the purpose of determining means for minimizing or ending all dumping within 5 years of the effective date of the act.

NOAA does not plan to implement section 203 because development of alternatives to ocean dumping is being addressed by others, particularly EPA, and any efforts by NOAA in this area is considered duplicative.

*Question.* Are there any fees assessed by the Coast Guard when they utilize the "ship rider" technique in monitoring dumping activities?

Answer. No. However, a dumper must provide, free of charge, quarters and subsistence equivalent to that provided for other personnel aboard.

Question. Of the ten dumping sites which are presently used by EPA, how many site surveys have been conducted during FY 1973, FY 1974, and FY 1975? Would you also indicate the cost of such surveys?

Answer. Baseline surveys were being conducted on four of the ten sites: (1) the New York sludge site, (2) the 106 mile site, (3) the Philadelphia sludge site, and (4) the DuPont site. According to EPA, the total cost of these surveys as of January 1976, was \$1.7 million. EPA is planning to begin surveys on the other six sites at a later date.

Mr. LEGGETT. Mr. Mannina, any questions?

Mr. MANNINA. Just one question, Mr. Chairman.

Have you gentlemen focused on the criteria used by EPA to permit ocean outfalls, and whether that criteria is as stringent, or less stringent than that used to make decisions on ocean dumping?

Mr. CROWLEY. Are you talking about the NPDES?

Mr. MANNINA. Yes.

Mr. CROWLEY. The west coast has the problem where sewage sludge is discharged into the ocean through ocean outfalls.

They have to get a permit for that, Mr. Mannina. We have not looked into those permits.

We do have an assignment looking at permits issued for discharges to inland waters.

We have not made a comparison of the requirements placed on inland discharges, with those placed on dischargers in the coastal areas.

We know that the EPA would like to let municipalities provide just primary treatment to the discharges that go to the ocean, whereas the law requires secondary treatment.

Mr. MANNINA. What about chemical discharges? Have you focused on that?

Mr. CROWLEY. Yes, we have. Industries discharging chemicals to inland waters are subject to national effluent standards which were required to be promulgated under Public Law 92-500.

Mr. MANNINA. Are they the same standards as for ocean dumping?

Mr. CROWLEY. I would assume they are the same effluent standards whether discharged inland or to the ocean through outfall pipes.

Mr. OLSON. I might add that EPA's criteria for dumping sludge is supposed to be the same regardless of whether it is discharged through outfall pipes or dumped by barges.

Mr. MANNINA. That was my question.

Thank you very much.

Thank you, Mr. Chairman.

Mr. LEGGETT. Thank you very much, Mr. Eschwege, and your distinguished colleagues. It was a very helpful report, and if you can include in your report any offhand recommendations for funding, it might help our bureaucracy, both on the Hill, and downtown, to respond to this statute.

Mr. ESCHWEGE. We will attempt to do that.

Mr. Leggett.

Our next witness is Mr. Kenneth Kamlet of the National Wildlife Federation, Washington, D.C.

Nice to have you before the committee.

**STATEMENT OF KENNETH S. KAMLET, NATIONAL WILDLIFE  
FEDERATION, WASHINGTON, D.C.**

Mr. KAMLET. Thank you, Mr. Chairman.

I shall not attempt to read all of my prepared statement.

Mr. LEGGETT. I note that you have a rather voluminous statement together with many exhibits.

Your statement will be included in the record in full, together with the appended exhibits, and you may proceed to summarize or highlight your statement as you deem appropriate.

[The statement referred to follows:]

**STATEMENT OF KENNETH S. KAMLET, ON BEHALF OF THE  
NATIONAL WILDLIFE FEDERATION**

It has now been more than 2½ years since the Marine Protection, Research, and Sanctuaries Act ("MPRSA") became effective and nearly half a year since the international "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter" ("Convention") entered into full force and became binding on the United States. It is therefore entirely appropriate for this Committee to seek from the agencies charged with carrying out the ocean dumping law and treaty an explanation as to why, for the most part, these agencies continue to fall short of full compliance with the law.

In their invitation to us to present this testimony, Chairmen Leggett and Murphy invited our attention to seven suggested questions. Rather than dwelling on each of the seven indicated topics, many of which we have previously testified to before this and other congressional committees (most of these earlier comments remain valid), we shall attempt to emphasize several developments which have occurred since this Committee's most recent oversight hearings last April. In general, the case histories we shall describe each touch upon one or more areas of the Committee's indicated concerns.

First, we will discuss the National Wildlife Federation's ("NWF") lawsuit against the Environmental Protection Agency ("EPA") and the Corps of Engineers, which challenged as legally deficient EPA's ocean dumping criteria applicable to dredged material ("dredged material criteria"). The subject matter of this lawsuit, and the fact that it was necessary to file such a suit, illustrate serious problems in three of the areas addressed by the Committee's suggested questions: inadequate program administration, inadequate program priority, and inadequate criteria for determining environmental effects of ocean dumping.

Next, we will discuss the background and significance of the EPA Administrator's decision upholding a permit action by EPA's Region III office which called for the phasing out of ocean dumping of sewage sludge by the City of Philadelphia. Although this decision was one of the more encouraging events in the history of ocean dumping regulation by EPA, it also illustrates the sometimes high variability in the vigor of program administration from one EPA regional office to another. It also sheds some light on the status of EPA research on alternatives to ocean dumping of sewage sludge.

Finally, we will address briefly the subject of ocean outfall regulation. Although the regulation of ocean discharges through land-connected outfall pipes is subject to section 403 of the Federal Water Pollution Control Act ("Water Act"), rather than directly to the requirements of the ocean dumping law, we believe it deserves this Committee's attention for at least three reasons: (1) In at least one key case which we will describe waste disposers are seeking to circumvent strict controls on ocean dumping by switching to less stringently controlled ocean outfalls—to the net disbenefit of the marine environment. (2) The Congressional committees with jurisdiction over the Water Act and over the MPRSA made an express effort to coordinate and reconcile the ocean disposal provisions of the two laws. And (3) EPA has elected to subject all ocean discharges, whether of outfall or vessel origin, to the identical, ocean dumping, criteria. The relationship between EPA's regulation of ocean outfalls and ocean dumping provides an illustration both of problems in program administration, and of pitfalls in the choice of ocean dumping alternatives.

## NWF'S LAWSUIT ON OCEAN DUMPING OF DREDGED MATERIAL

In a lawsuit (Civil Action No. 75-1927) filed on November 19, 1975 in federal district court for the District of Columbia, the National Wildlife Federation—the Nation's largest private conservation education organization—challenged the dredged material criteria, developed by EPA in consultation with the Corps of Engineers, as legally deficient and sought a court order requiring EPA to bring these criteria into conformity with legal requirements.

According to the NWF suit, the dredged material criteria violate the law in the following five major respects:

1. They fail to prohibit ocean dumping which may unreasonably degrade or endanger the marine environment or human health.

2. They allow ocean dumping without requiring full prior consideration of all evaluation factors required to be considered by the ocean dumping law.

3. They allow ocean dumping without requiring full prior consideration of all evaluation factors required to be considered by the ocean dumping treaty.

4. They allow the ocean dumping of substances the dumping of which is prohibited by the treaty.

5. They are impermissibly less protective of the environment than the criteria for non-dredged wastes.

A copy of the NWF Complaint has been submitted as *Exhibit 1*.

The Complaint requests three supplementary forms of relief:

- (1) A declaration that the existing dredged material criteria are legally deficient.

- (2) An order directing EPA to issue new criteria remedying these legal defects. And,

- (3) An injunction barring continued Department of the Army approval for the ocean dumping of dredged material until the dredged material criteria, and Corps policies and procedures, have been brought into full conformity with the requirements of the MPRSA and the Convention.

NWF's Executive Vice President, Thomas L. Kimball, explained the lawsuit's purpose in a November 20 Press Release:

"We are not seeking a complete ban on ocean dumping or trying to deny the Corps all options for disposing of dredged materials. We simply want the Corps to follow the law's criteria and consider a proper balance between environmental and economic values before approving dumping proposals."

Inasmuch as the MPRSA itself makes provision for a waiver by the EPA Administrator of the Act's strict environmental protection requirements (where the Secretary certifies that there is "no economically feasible" alternative disposal site or method), the net effect of a court decision in NWF's favor would be simply to make the ocean dumping of heavily polluted dredged material a recourse of last, rather than first, resort.

As was made clear by this Committee in reporting out the ocean dumping bill (H.R. Rept. No. 92-361), this was the sort of balance intended by Congress:

"H.R. 9727 will enable this country to restore a proper balance between its economic and environmental values, as these relate to ocean dumping. It is clear that ports and harbors cannot be allowed to silt up and that cities cannot be permitted to strangle in their own waste production, but neither can these problems be resolved at the cost of threatening a critical resource of life on this planet. In this bill we give to the agencies of Government tools with which they can balance these values."

Representative John Dingle, at that time Chairman of the Subcommittee now chaired by the distinguished gentleman from California, expressed his own similar view:

"Let me make you a very simple and very clear statement . . . By this legislation, we are not going to hold up the ocean dumping or other dumpings entirely. We are not, by this legislation before us, going to halt, let us say, dredging and filling in the harbors. It is not our intention to do that. It is the intention I think, and the intention of the administration, to handle it in careful fashion and in an environmentally sound fashion that would consider fish, wildlife and other things. That, very strongly, is the intention of the Chair."

Hearings on Ocean Dumping of Waste Materials Before the Subcomm. on Fisheries and Wildlife Conservation and the Subcomm. on Oceanography of the



House Comm. on Merchant Marine and Fisheries, 92d Cong., 1st Sess., Ser. 2, at 343 (1971).

A more detailed discussion of the scope and deficiencies of the federal program for regulating the ocean dumping of dredged material, and suggestions for improvement, is set out in a paper which I will deliver next week at an American Society of Civil Engineer Specialty Conference on "Dredging and Its Environmental Effects." A copy of this paper has been submitted as Exhibit 2.

Finally, in concluding this outline of the ocean dumping programs for dredged material, we wish to call to the Committee's attention some disturbing evidence which may explain why local Corps of Engineer officials, in evaluating ocean dumping proposals, sometimes seem to be marching to the beat of a different drummer. On December 24, 1975, the Anchorage District Office of the Corps issued a public notice (No. NPA 75-187) announcing the revocation of prohibitions on the use of certain ocean dumping grounds off the northeast coast of Kodiak Island. Cited as authority for this action was section 4 of the River and Harbor Act of March 3, 1905 (33 Stat. 1147; 33 U.S.C. 419)—a provision which, under section 106 of the MPRSA, became null and void 2½ years ago. Moreover, Corps regulations still on the books (33 C.F.R. Part 205) and captioned "Dumping Grounds Regulations" appear to assert on behalf of the Corps, powers and responsibilities foreclosed to it when the MPRSA became effective. For example, contrary to the entire thrust and intent of the ocean dumping law, section 205.10(a)(2) of the Corps' regulations directs that "all material" resulting from the dredging of specified New York rivers and harbors is "required to be dumped at sea." (Emphasis added).

NWF alerted EPA and the Corps to the existence of this problem on December 30, 1975. On January 5, 1976, EPA's General Counsel issued a Memorandum to the Regional Counsel for all coastal EPA Regions calling their attention to "the revelation that there may be ocean disposal sites which are in use and which may have been designated under laws no longer valid for this purpose." The assistance of the Regions was requested in ascertaining whether there exist any active ocean dumping sites designated or activities regulated under legal authority other than the Ocean Dumping Act.

Copies of Public Notice No. NPA 75-187 and of the January 5 EPA Memorandum have been submitted as Exhibits 3 and 4.

#### DECISION BY THE EPA ADMINISTRATOR ON PHASING OUT OCEAN DUMPING OF SEWAGE SLUDGE

In a September 25, 1975 decision, EPA Administrator Russell E. Train affirmed an earlier permit action by the Region III Administrator which placed the City of Philadelphia on a schedule for terminating its ocean dumping of sewage sludge by 1981. This decision, which came at the conclusion of two weeks of intensive adjudicatory hearings, is significant because its rationale applies equally well to all other ocean-dumpers of sewage sludge:

The criteria of the Act include consideration of whether the dumping will unreasonably *endanger* the marine environment and specifically direct attention towards the "persistence and permanence of the effects of dumping." It is obvious that even assuming no harm has occurred at this point in time, the City has not shown that its continued dumping will not contribute to a general deterioration of the ocean or that such deterioration will not eventually cause adverse effects. It is significant that the scientists testifying at the hearing, while acknowledging the limitations on the present levels of knowledge to identify harm, expressed grave concern over the continued accumulation of pollutants in any ocean area, and the waters off the highly populated east coast in particular. As has been observed, the ocean is not an infinite sink.

Congress, of course, recognized that any decision regarding disposal of wastes cannot be made solely on the basis of the harm such disposal causes to one portion of the environment. The probable impact of alternative methods or locations of disposal, such as land based alternatives, must also be considered. Risks must be balanced to insure that the overall public interest is served. The evidence in the record regarding the method of disposing of sewage sludge gives me no hesitancy in agreeing with the Regional Administrator and the Hearing Panel that the methods of on-land disposal of sewage sludge can be successfully implemented by the City of Philadelphia.

... Many major American cities, lacking the option provided by having an ocean nearby, have employed a variety of methods so the City of Philadelphia is not without guidance. The panel is correct in assuming that the City has a large number of options available to it which can be developed within the time frame allowed.

I want to emphasize my conviction that we must begin to take a harder look at how we are going to accommodate the ever-increasing amounts of sludge produced by our treatment plants. We have focused too often, I believe, on the short range solution and addressed it solely in terms of disposing of an unwanted material. As with all materials, we must readjust our "throw away" mentality and examine every unwanted item to see if it can be recycled into beneficial uses.

The beneficial characteristics of sewage have been recognized for centuries. I am encouraged by the evidence in the record of the research and experimentation into uses for sludge. This country must take a leadership role in developing socially acceptable uses for this material which will enable us to recycle rather than waste the beneficial materials in it. We must begin to think in terms of "use" rather than "disposal". There are techniques for converting wastes into resources. While there are also some problems, they appear to be manageable. The Ocean Dumping Act, as presented here, can provide a valuable impetus to developing these alternatives to their full potential.

The full text of the EPA decision, as reprinted in the Environmental Law Reporter (5 ELR 30003-04), has been submitted as Exhibit 5. An instructive article, entitled, "Ocean Dumping: Philadelphia's Story," which appeared in the October 1975 issue of Environmental Science & Technology (Vol. 9, No. 10), has been submitted as Exhibit 6.

Philadelphia is not the Nation's only ocean-dumper of sewage sludge, however. Of the nearly 5.7 million tons of sewage sludge ocean-dumped off the Atlantic coast of the U.S. in 1974, somewhere between 85 and 90 percent of the total was contributed by more than a dozen New York and New Jersey (EPA Region II) counties and municipalities. None of these other dumpers (with the exception of the City of Camden, which ocean-dumps a tenth of what Philadelphia does at the same site) has been placed on a firm phase-out schedule. (Camden, whose dumping comes under Region III's permit jurisdiction, has been given until 1980 to terminate its ocean dumping; this deadline may possibly be further shortened at the conclusion of court-supervised negotiations between EPA and the State of Maryland).

EPA Region II evidently plans to take no action pending completion by the Interstate Sanitation Commission ("ISC") of a three-phase study of sewage sludge management alternatives available to New York and New Jersey ocean-dumpers. A "Phase 1 Report of Technical Alternatives to Ocean Disposal of Sludge in the New York City-New Jersey Metropolitan Area," was published in June, 1975. The preferred alternative recommended by the Phase 1 ISC Report was a combination of multiple-hearth incineration and pyrolysis—a choice which has been criticized as:

- (1) Not capable of being implemented until the mid- to late 1980's.
- (2) Not giving sufficient attention to individualized approaches by one or a few municipalities, as opposed to grandiose solutions capable of handling the entire problem in one fell swoop.
- (3) Not giving sufficient attention to beneficial land treatment (particularly, non-agricultural) opportunities for sewage sludge within a 100- to 200-mile radius of the study-area treatment plants.

Exhibits 7 through 10 present two critiques (by NWF and the Marine Environmental Council of Long Island) of the ISC Report, and responses from EPA and the Interstate Sanitation Commission.

In the meantime (while Region II waits and the deterioration of the New York Bight continues), other municipalities are casting covetous glances to the sea. The City of Houston has already made advances (in the form of preliminary permit submittals) to EPA Region VI. Others will surely follow as sludge production, in response to Federal Water Pollution Control Act requirements, continues to increase. It is vitally important that there be available alternatives to ocean dumping which not only do not degrade the environment, but benefit it. Obviously, it is no less important that the EPA Regions that are faced with new ocean dumping requests remain firm in resisting them.

## OCEAN OUTFALL DISCHARGES: OCEAN DUMPING'S NEGLECTED BIG SISTER

Some cities that do not ocean-dump sewage sludge discharge sewage wastewater into the ocean through ocean outfall pipes. Many industrial companies, including some pharmaceutical and chemical concerns which now dispose of their wastes by ocean dumping, are looking to ocean outfalls as an expedient alternative. As illustrated by the accompanying Table, EPA has issued permits for over 430 ocean outfall discharges which pour wastewaters of varying potencies into the ocean at the rate of well over 12.7 billion gallons per day. Regions I, IV, and IX, which possess relatively little in the way of ocean dumping activity, together account for nearly three quarters of the ocean outfall permits issued (and an even higher proportion of the total discharge quantity for which we have data).

TABLE.—OCEAN OUTFALLS IN THE UNITED STATES<sup>1</sup>

EPA region	Number of outfall permits issued				Quantity of outfall discharges (MGD <sup>2</sup> )			
	Municipal	Industrial	Other	Total	Municipal	Industrial	Other	Total
I.....	16	10	36	62	9.9	<sup>3</sup> 1,187.7	1.7	1,199.3
II.....	17	34	58	109	<sup>4</sup> 156.0	<sup>4</sup> 447.0	( <sup>5</sup> )	( <sup>6</sup> )
III.....	1	0	0	1	( <sup>6</sup> )			
IV.....	17	18	22	57	258.0	5,675.0	12.0	5,945.0
VI.....	0	0	1	1	0	0	0.092	0.092
IX.....	40	53	112	205	1,700.0	2,950.0	503.0	<sup>6</sup> 5,153.0
X.....	0	3	0	3	0	35.0	0	35.0
Total.....	91	118	229	438	2,123.9	10,294.7	516.792	12,332.392

<sup>1</sup> This table was prepared by W. M. Jeffress, Jr., based upon information provided to NWF by the respective EPA regions. The table is probably an underestimate of the number of permits and discharge quantities in view of gaps in the data provided by EPA.

<sup>2</sup> Quantities are expressed in million gallons per day (MG/d).

<sup>3</sup> The Seabrook Nuclear Generating Station is responsible for 1,186 MG/d of this amount.

<sup>4</sup> This figure is based upon approximations in buff printout sheets from region II. It is probably an underestimate.

<sup>5</sup> This figure represents discharge quantities for only the 3 sources (Toms River Chemical of New Jersey, Union Carbide of Puerto Rico, and Commonwealth Oil Refining Co., of Puerto Rico) for which NWF has quantitative data.

<sup>6</sup> Unknown.

<sup>7</sup> Permit for the sewage treatment plant of Ocean City, Md. Sussex County, Del., plans to discharge 1 MG/d beginning on Nov. 1, 1976.

<sup>8</sup> This permit expired on Dec. 31, 1975.

<sup>9</sup> The quantity figures for region IX represent only California discharges due to lack of data for discharge sources in Hawaii.

Although dilute wastewaters of the sort typically discharged through fixed outfalls have less potential for doing short-term damage than the more concentrated wastes typically dumped from moving barges, outfall discharges tend to occur in relatively more sensitive nearshore coastal areas than ocean dumping. Given the large wastewater quantities involved, a considerable potential for environmental harm must be deemed to exist.

With the assistance of W. M. Jeffress, Jr., a lawyer and civil engineer, the National Wildlife Federation contacted each of the coastal EPA regional offices to request (pursuant to the Freedom of Information Act) information on ocean outfall discharges off U.S. shores. It quickly became apparent that many EPA Regions were treating ocean discharges no differently from discharges to inland waterways and were ignoring statutory and regulatory ocean discharge limitations. In most cases, permits for ocean discharges have been issued for 5 years at a time (i.e., the first of such permits will not be coming up for review for another two years). NWF has sent critiques of regional ocean outfall programs and requests for remedial action to all relevant EPA Regions. The only response received to date (from Region VI) has promised improved public notice procedures (substantive compliance in this Region, which has a very small ocean outfall program, appears adequate). Copies of representative critique letters (for Regions I, IV, and IX) have been submitted as Exhibits 11 through 13.

Inadequacies in the federal program of ocean outfall regulation, although this program derives from the Water Act rather than the Ocean Dumping law, are legitimately matters of concern to this Committee. Unless ocean discharges through outfalls are regulated as strictly as ocean dumping from

vessels, the marine protection goals of both acts will be frustrated.<sup>1</sup> Not only that, but ocean-dumpers will start switching in droves to ocean outfalls if this regulatory disparity continues.

This "switching of horses in mid-ocean," as it were, has already begun. We will conclude this testimony with a brief example of ocean dumping activities and ocean outfall plans of this kind in Atlantic Ocean waters off the northern coast of Puerto Rico (under EPA Region II jurisdiction).

By Public Notice No. 75-455, dated June 20, 1975, Region II announced its tentative determination to reissue ocean dumping permits to eight pharmaceutical companies, which had for several years been dumping an assortment of wastes at a site (established in 1972) some 40 miles from shore, in water ranging from 12 to 24 thousand feet. Three of the dumpers (Schering, Oxochem, and P. R. Olefins) were described (in "Special Condition 7") as having "submitted detailed engineering reports or schedules for the implementation of environmentally acceptable alternatives for the complete phasing out of ocean dumping" by indicated deadline dates (ranging from June 1976 to June 1977) (emphasis added). The remaining five (Upjohn; Abbott Chemical; Pfizer; Merck, Sharp & Dohme; and Brischem) were described simply as having "evidenced a firm commitment to enter into an agreement with the Puerto Rico Aqueduct and Sewer Authority to participate fully in the Barceloneta Regional Waste Treatment System."

A first glance this may seem no more than a commendable effort to terminate eight potentially hazardous ocean-dumpers. Upon closer scrutiny, however, it turns out that one is trading the frying pan for the fire.

The "Barceloneta Regional Waste Treatment System" is now and for some time will continue to be a primary sewage treatment facility (physical separation of floating and suspended solids), from which "treated" wastewater will be discharged by an outfall pipe into the Atlantic Ocean, some three thousand feet from shore, and in water only 90 feet deep. (Unlike most federally assisted publicly owned treatment works, the Barceloneta facility will service primarily industrial rather than municipal users.) Since virtually nothing in the pharmaceutical and chemical wastes proposed for transfer to the Barceloneta system is present in floating or suspended form (i.e., the wastes are water soluble), primary treatment will have absolutely no effect on such waste streams. The net result, therefore, of participation by the five companies in the Barceloneta facility will be a shift in ocean disposal from deepwater to shallow water and from offshore to nearshore, with a presumptive increase rather than decrease in environmental impact. Even when the system is eventually upgraded to secondary treatment (i.e., the use of microorganisms to biologically decompose organic matter), it is possible that antibiotics and other drugs present in the pharmaceutical mix will impair or block the proper functioning of the microorganisms needed to carry out efficient waste treatment. If the system functions properly, it may unleash into the environment new strains of drug-resistant microbes, posing the risk of new, untreatable human diseases.

It appeared at the time (and continues to appear) to the National Wildlife Federation that EPA was wrong to tacitly acquiesce in the implementation of an alternative to ocean dumping which could heighten rather than lessen the harm to the marine environment and to public health. By letter of August 6, 1975, we communicated to Region II our view that "the mere 'participation' by the five (5) indicated industrial dischargers in the Barceloneta Regional Waste Treatment System [could not] be equated with the implementation of a satisfactory alternative to ocean dumping." We "strongly urge[d] that tentative special condition 7.b. be revised to require the subject companies to report to EPA on the availability of appropriate land-based disposal and recycling alternatives to ocean disposal." An August 5 NWF letter and an

<sup>1</sup>The Ocean Dumping law and the Water Act, which were passed by Congress within a week of one another and with close coordination of the ocean disposal provisions of the two acts between the Senate Commerce and Public Works Committee, may and should be read together. Thus, the Senate Report on the ocean dumping bill states: "As reported, H.R. 9727 reflects an agreement between the Chairmen of the Committee on Commerce and Public Works, ensuring consistency between H.R. 9727 and the proposed Federal Water Pollution Control Act Amendments of 1971 (S. 2770)." S. Rept. No. 92-451, 92d Cong., 1st Sess. (1971). To the same effect is the Committee Report on the Water Act, S. Rept. No. 414, 92d Cong., 1st Sess. 74-75 (1971).

August 15 letter from the Natural Resources Defense Council ("NRDC") questioned the wisdom and legality of the overall plans for the Barceloneta system.

By letter of September 2, EPA requested our reactions to a proposed modification to tentative special condition 7.b. which would require the companies to submit a detailed report on alternatives and to implement such alternatives by early 1978—but only if the Barceloneta system refused to accept waste waters from these companies. An alternative formulation, prepared by the Chief of Region II's Marine Protection Program, which would have required the companies to "provide documentation 90 days prior to connection with the . . . treatment system demonstrating that such treatment is environmentally acceptable," was deleted from a staff recommendation sent to the Region's Public Hearing Officer on September 4.

On September 5, NWF again communicated its view that:

Nothing in the MPRSA, or elsewhere, allows an ocean dumper to switch to an alternative location and method of ocean disposal without close prior EPA evaluation of both the "appropriateness" of that shift (in light of its environmental and other "public interest" impact) and the "need to continue ocean disposal, in whatever form (relative to other potential alternatives with less severe adverse impacts).

In a letter dated September 8, the Region II Administrator wrote to assure NWF that "Region II does not intend to issue a permit to PRASA [the Puerto Rico Sewer and Aqueduct Authority which is responsible for the Barceloneta plant] that is not in full and complete compliance with all requirements of the Federal Water Pollution Control Act Amendments of 1972 and the regulations promulgated thereunder." No similar assurance was given of compliance with the MPRSA.

On September 17, the Regional Hearing Officer issued his recommendations. On the question of disputed Special Condition 7, he recommended that EPA do one of two possible things: Either, require those companies electing to connect with the Barceloneta plant whose pollutants are not susceptible to treatment by the plant to apply "appropriate pretreatment standards under the FWPCA," or, require compliance with the requirements of the ocean dumping criteria "with respect to land-based alternatives to ocean discharges as urged by the National Wildlife Federation."

In a September 30 letter to NRDC, the Region II Administrator again pledged that "EPA will permit the discharge [from the Barceloneta ocean outfall] only if the law so allows." He further stated that "EPA will not sanction the use of either the BSTP or the ocean outfall until all appropriate permits have been issued and become effective and only after other necessary authorizations have been granted."

Finally, on October 14, the Region II Administrator issued his decision on the various pharmaceutical companies. He stated his disagreement with NWF's position "that the present permittees have not satisfied the requirement of identifying appropriate alternatives to ocean dumping." He considered that the hook-in alternative for the five companies "seems to be the most cost-effective," indicated that "EPA will not issue a NPDES permit to PRASA for the Barceloneta outfall, if it discharges a mix of municipal and industrial wastes which violates either . . . water quality standard[s] or Section 403 requirements," and expressed his belief that the economic advantages of a joint municipal/industrial treatment system, "will drive forward the design and construction of [an] adequate secondary treatment system."

We certainly hope so, but somehow we remain uneasy.

We submit as Exhibits 14 through 17 copies of NWF's August 5 letter, NRDC's August 15 letter, and the Region II Administrator's responses of September 8 and September 30. Additional documents are available at the Committee's request.

#### CONCLUSIONS AND RECOMMENDATIONS

1. EPA's ocean dumping criteria applicable to dredged material do not satisfy legal requirements of either the MPRSA or the ocean dumping treaty. The Committee should ask EPA to indicate the steps it is taking to bring the ocean dumping criteria into conformity with the treaty and the MPRSA.

2. The Corps of Engineers should be asked to report on the steps it is taking to rescind those portions of 33 C.F.R. Part 205 which conflict with and/or have been superseded by the MPRSA.

3. The Committee should require both the Corps and the Coast Guard to file annual reports on their ocean dumping activities. (as EPA and NOAA now do).

4. EPA's regulation of the ocean dumping of municipal sewage sludge varies greatly in both approach and emphasis from Region III (which has all its dumpers on phase-out schedules of 5 years or less) and Region II (which has yet to specify a termination date for any of its sludge dumpers). The Committee should ask EPA whether it regards Administrator Train's September 25 decision on sludge dumping by Philadelphia as relevant to Region II. The Committee should ask EPA to itemize the total funds spent to date on research into landbased alternatives for sewage sludge management, indicating by subject and stages of completion all current, completed, and projected research and development grants on this subject. EPA should also be asked to make projections of the increases in total sludge production anticipated over the next several decades and to estimate the land and/or facility requirements (indicating both nature and price tag) for handling this sludge short of ocean disposal. EPA should then be asked whether it has taken or is planning specific steps to assure the availability of these alternatives when they are needed; if not, why not?

5. EPA's program for regulation of ocean outfall discharges can only be characterized as being in a state of great disarray. EPA should be asked to describe the steps it is taking to put the program on the right track and to assure that dumpers phased out of barge disposal will not be able to revert to ocean disposal through outfalls under relaxed regulations.

6. The General Accounting Office should be asked to investigate the interface between EPA's ocean dumping and its ocean outfall programs in general, and the history and propriety of federal involvement in the Barceloneta Regional Treatment System in particular.

7. EPA has established program priorities at the headquarters' level which it circulates to the regions each year. EPA should be asked to indicate where, if anywhere, in these "program guidance memoranda," marine protection is represented.

(Committee Note.—The exhibits attached to Mr. Kamlet's statement were placed in the files of the subcommittees.)

Mr. KAMLET. Thank you very much, Mr. Chairman.

Mr. Chairman and members of the subcommittee, I would like to address my oral testimony to three issues which will illustrate, I believe, the status of Federal agency compliance with the legal requirements of the ocean dumping law and the ocean dumping treaty.

The three issues are (1) the adequacy of the Federal program for regulating the ocean dumping of dredged material; (2) the consistency from one regional office to another of EPA's approach toward phasing out the ocean dumping of sewage sludge; and (3) the ability of ocean dumpers to escape strict regulation of their dumping activities by switching to the discharge of their wastes through ocean outfall pipes.

With respect to the ocean dumping of dredged material—more such material is disposed of at sea today than ever before. For example, dredged material dumping off U.S. coasts exceeded 120 million tons in 1974, which was triple the level reported for 1968, and accounted for 90 percent of all United States ocean dumping and one-quarter of all dredged material disposed of in the United States in 1974. To place this in the perspective of natural processes, this amount of sediment represents over four times the total annual discharge of suspended sediment by all U.S. Atlantic coast rivers.

Paralleling this increase in dredged material quantities has been a decrease in the number of active dumping sites, with the result that

while the dumping rate has increased some threefold since 1968, the average "pressure" on each dumping site has increased more than eightfold. And while there appears to have been some reduction in the proportion of dump sites within 3 miles of shore, dredged material dumping continues to be concentrated at relatively near shore areas of the biologically productive and ecologically sensitive Continental Shelf.

As is perhaps best illustrated by avalanches and earthquakes, too much sediment—even if unpolluted—in the wrong place can do a lot of damage.

All dredged sediment being ocean dumped is not unpolluted, however. According to one of quoted Corps estimate—and this may be understating the situation—"polluted" dredged material represents 34 percent overall of the dredge dumping total with the figure rising to 45 percent for spoil dumped off the Atlantic Coast.

The environmental significance of the ocean dumping of polluted dredged material may extend far beyond localized physical effects, including, in some cases, contamination of the human food chain.

What does the law say about permitting the ocean dumping of such materials?

The ocean dumping law says that the Corps of Engineers may authorize the dumping of dredged material only if it can be shown that the proposed dumping will not unreasonably degrade or endanger the marine environment and human health, as determined through the application of ocean dumping criteria established by EPA which, in turn, must consider at least the nine evaluation factors specified in section 102(a) of the statute.

What is happening in practice? In practice, the ocean dumping criteria specify that the ocean dumping of dredged material "will be permitted" unless there is evidence that it will have an unacceptable adverse impact. In practice, Corps regulations state that material dredged from certain New York rivers and harbors is "required to be dumped at sea."

In practice, certain Corps of Engineer officials consign dredged material to dump sites in the ocean precisely because the material is found to be polluted. And in practice, not a single request for an ocean dumping permit was turned down by the Corps of Engineers in fiscal year 1974.

In an effort to correct some of the obvious shortcomings in the program for regulating the ocean dumping of dredged materials, the National Wildlife Federation went to court on November 19 to seek an order directing EPA to conform its ocean dumping criteria, as they relate to dredged material, to the requirements of both the ocean dumping law, and the International Ocean Dumping Treaty, which entered into full force about half a year ago.

I have submitted to the committee staff, for inclusion in the record, copies of the complaint in our lawsuit and of a paper which suggests some specific remedial measures. These documents have been marked exhibits 1 and 2.

Briefly, the five major contentions of our lawsuit are that the dredged material criteria:

One: Fail to prohibit ocean dumping which may unreasonably degrade or endanger the marine environment or human health.

Two: Allow ocean dumping without full consideration of all evaluation factors required to be considered by the ocean dumping law.

Three: Allow ocean dumping without full consideration of all evaluation factors required to be considered by the ocean dumping treaty.

Four: Allow the ocean dumping of substances which the treaty prohibits from being dumped.

Five: Do not afford the environment as much protection against dredged as against nondredged wastes.

Exhibits 3 and 4, Mr. Chairman, illustrate the related matter of how Corps of Engineer district offices have, in some cases, continued to operate under the conflicting authority of a 1905 law which was superseded by the ocean dumping law 21½ years ago.

Now, to switch briefly to a more pleasant subject, the decision by EPA's Administrator to uphold the phased termination of sewage sludge ocean dumping by the city of Philadelphia.

Back in 1971, when this committee and its Senate counterparts were holding hearings on a proposed ocean dumping law, the then head of EPA, William D. Ruckelhaus, stated that where communities had heavy investments in barging facilities and equipment, where their sludge was "digested" rather than raw, and where acceptable land-based disposal methods were not immediately available, "EPA would temporarily allow the dumping to be continued but would require it to be phased out within a reasonable period of time." He also pledged that "communities already dumping at sea would not be allowed to increase the volume of such dumping over current levels," and that municipalities not then engaged in ocean dumping would "not be allowed to start."

EPA's present Administrator, Russell E. Train, expressed a similar view in his then capacity as Chairman of the Council on Environmental Quality.

Up until about 4 months ago, EPA blithely ignored this commitment to call a halt to ocean dumping of sewage sludge. For example, at hearings held by this committee last spring, an EPA Assistant Administrator intimated that ocean disposal of sewage sludge would continue to be considered an "interim" practice only until ocean disposal was conclusively shown to be the panacea he already knew it to be.

Even now some EPA's regional offices appear to be more closely allied with this philosophy of its Assistant Administrator—who has since left this post—than with statements of agency policy by EPA's present and former Administrators.

Although EPA records indicate that sludge dumping in 1974 increased by less than a quarter of a million tons relative to 1973, the 5,676,000 tons of sludge ocean dumped in 1974 represented a more-than-26-percent increase over dumping levels reported for 1968.

It was welcome news to us, therefore, when, on September 25, 1975, EPA Administrator Russell Train announced that he was upholding an earlier permit action by the region III EPA Office which had placed the city of Philadelphia on a schedule for terminating its sludge dumping by 1981.

In his decision, Mr. Train concluded not only that the city had failed to show that its dumping would not contribute to the deterio-



ration of the ocean or eventually cause adverse effects, but also that the city had available to it a large number of options for disposing of its sludge on land. He went on to emphasize that "this country must take a leadership role in developing socially acceptable uses for this material which will enable us to recycle rather than waste the beneficial materials in it," and that "we must begin to think in terms of 'use' rather than 'disposal.'"

He pointed out that the Ocean Dumping Act "can provide a valuable impetus to developing these alternatives to their full potential."

The cities of Philadelphia and Camden have now both been directed by EPA region III to phase out their ocean dumping of sewage sludge within the next 4 or 5 years.

A short distance away, however, not one of the more than a dozen ocean-dumping counties and municipalities under the jurisdiction of EPA region II has been given a fixed date for keeping their sludge out of the ocean. This is especially unfortunate since these New York and New Jersey dumpers contribute nearly 90 percent of all ocean-dumped sludge.

Region II evidently plans to take no action pending completion of a three-phase study on sludge management alternatives. Faced with a tough problem, it has taken the classic bureaucratic out of referring the matter for study to a "commission"—in this case, the Interstate Sanitation Commission.

The region's approach to pollution in the New York bight could appropriately be analogized to Nero's handling of a certain fire problem in Rome. I guess that would make the Commission the counterpart of Nero's fiddle!

Based on the Commission's phase I report and the recommendations it has made, it could easily be a decade or more before there is any meaningful decline in the level of sludge dumping in the New York Bight.

Exhibits 5 and 6 describe the Philadelphia case and set forth the Administrator's decision. Exhibits 7 through 10 present two critiques and two defenses of the Interstate Sanitation Commission report.

I leave it to the committee and other interested persons to decide on their own whether those criticisms are justified.

Our purpose in calling the committee's attention to EPA's handling of the sludge-dumping problem is really twofold. One, to illustrate variations in approach from one EPA region to another, and, two, to make the point that alternatives to ocean dumping do, in fact, exist.

The final subject I will address today is the possible existence of a gap in EPA's regulatory programs which could have the effect of allowing ocean dumpers that have been required to terminate their dumping activities under the ocean-dumping law, to resume ocean disposal of their wastes by way of ocean outfall pipes under the Federal Water Pollution Control Act.

As of the present time, EPA has issued permits for over 430 ocean outfall discharges which pour well over 12.7 billion gallons per day of wastewaters of varying potencies into the ocean all along the U.S. coastline. As a matter of possible interest, heavy use of ocean outfalls is made by Chairman Leggett's home State of California and by Chairman Murphy's home State of New York.

A survey by the National Wildlife Federation of ocean outfall programs in each of the coastal EPA regions has revealed that most EPA regions are not properly regulating this activity. Examples of our findings are reproduced in exhibits 11 through 13, in the form of representative critique letters to the various EPA regions.

With one exception, region VI, we have yet to receive responses from the other regions.

Mr. LEGGETT. Would you restate what you said about my home State again, please?

Mr. KAMLET. There is a heavy use made in California of ocean outfalls for the discharge of heavy sewage and other wastes.

Mr. LEGGETT. All right. Thank you.

Mr. KAMLET. One pointed example of industry efforts to take advantage of this disparity in the stringency of EPA regulation of ocean discharges from pipes versus barges, are the five Puerto Rico pharmaceutical companies that sought and have received permission from EPA Region II to hook into the ocean outfall of the so-called Barceloneta Regional Sewage Treatment System.

The net effect of the transfer of these pharmaceutical wastes to the Barceloneta outfall line, will be their discharge into ocean water only 90 feet deep and a mere 3,000 feet from shore, as opposed to the 40-mile from shore, 12,000 to 24,000-foot deep dumping site to which they are now being barged.

I believe the gentleman who testified on behalf of the General Accounting Office mentioned that the present dumping site out there was 4 miles from shore. That must have been a typographical error. The correct distance is 42 miles from shore.

From a variety of standpoints, it is questionable that this tie-in alternative is an appropriate alternative to ocean dumping within the meaning of section 102(a)(G) of the ocean dumping law.

The approach taken by EPA Region II, therefore, that the question of the appropriateness of the treatment plant tie-in can be left to the NPDES process, does too little too late. For one thing, if the same logic were carried over to a disposal alternative over which EPA did not otherwise have regulatory authority—that is, a land application alternative for sewage sludge—EPA would be left without any control at all over the dumper's choice of alternatives which could easily result in more rather than less harm to the environment.

This is not what the ocean dumping law intended, a fact clearly recognized by EPA Administrator Train himself in his decision in the Philadelphia sewage sludge case.

For another thing, the NPDES approach adopted by region II greatly diminishes EPA's regulatory options. Instead of having control over the waste characteristics of each individual pharmaceutical company, under the NPDES approach the only point of review is the aggregate discharge, consisting of wastes from several municipalities and 15 or 16 industries. Moreover, the regulatory focus is shifted from best protecting the environment to merely meeting water quality standards, and rather vague water quality standards at that, Mr. Chairman.

And, finally, whatever the impact in absolute terms of discharging these wastes through a nearshore outfall, it is clear that relative

to deep ocean dumping, this is a worse rather than a better alternative. From all of these standpoints, region II's unwillingness to take advantage of the ocean dumping law as a tool for forcing dumpers into environmentally beneficial—or, at least, less damaging alternatives—is unfortunate if not illegal.

This approach, coupled with the general laxity on the part of EPA regions in their regulation of ocean outfall discharges, will almost certainly result in a trend toward increasing use of ocean outfalls by municipalities and industries who find the ocean foreclosed to them for direct dumping. We believe this committee should do something to close this loophole.

In conclusion, we recommend the following steps to the Committee: (1) EPA should be asked to report on the steps it is taking to bring the ocean dumping criteria into conformity with the ocean dumping law and treaty.

The ocean dumping treaty has been in active force for only about a half year. I think it would be appropriate to find out what steps EPA and other agencies have taken to fully conform their regulations to the requirements of that treaty. (2) The corps should be asked to report on the steps it is taking to rescind those portions of 33 CFR, part 205, which conflict with and/or have been superseded by the ocean dumping law. (3) The corps and the Coast Guard should both be required to file annual reports on their ocean dumping programs as EPA and NOAA are now required to do. (4) EPA should be asked whether it regards Administrator Train's decision on ocean dumping of sludge by Philadelphia to have any bearing on sludge management policy in EPA Region II, (5) EPA should be asked to detail its research and development activities related to finding land-based alternatives to the ocean dumping of sewage sludge. (6) EPA should be asked to report on the steps it is taking to put its ocean outfall program on the right track and to assure that dumpers phased out of ocean dumping will not be able to revert back to ocean disposal under relaxed controls in the form of discharge through outfalls.

I might note, in response to the question by Mr. Mannina that although the criteria employed by EPA for regulating ocean dumping and ocean discharges are theoretically the same criteria, our survey has indicated that, at least until very recently, many EPA regions were not even aware that the ocean dumping criteria applied to ocean outfalls. And from what we have seen, even those that are aware of this fact are not doing very much about it. (7) The General Accounting Office should be asked to investigate the interface between EPA's ocean dumping and ocean outfall programs in general and the history and propriety of Federal involvement in the Barceloneta Regional Treatment System in particular.

With respect to the latter, the Barceloneta Treatment facility will handle industrial wastes to the tune of 97 percent of the total waste input instead of treating residential or municipal waste which, it is my understanding, is what the law was intended to serve. Such an investigation by GAO could then be forwarded to the several congressional committees concerned with aspects of these issues. (8) EPA should be asked to explain the priority or lack of priority as-

signed to ocean dumping regulations and marine protection in program guidance memoranda circulated to its regional offices as part of the annual budget process.

I think the committee will find no reference at all is made to marine protection in some of those program guidance memoranda.

Thank you, Mr. Chairman.

Mr. LEGGETT. Thank you very much, Mr. Kamlet.

Your analysis and recommendations are very helpful, and we will follow up on some of the questions you have asked that we asked these various agencies.

Now, as I understand your lawsuit that is against the Secretary of the Army, EPA Director Russell Train and, I guess, others?

Mr. KAMLET. It is directed against the EPA Administrator, the Secretary of Army and the Chief of Engineers.

Mr. LEGGETT. Is your lawsuit based on just dredge material?

Mr. KAMLET. This lawsuit is directed at the dredge material regulatory program alone.

Mr. LEGGETT. Why not take on the 10 million tons worth of industrial and sewage sludge that apparently has been dumped over the last 3 years?

Is that not a more deleterious and serious activity?

Mr. KAMLET. Well, I would not want to say more deleterious and serious.

The toxicity of any given amount of industrial waste or sewage sludge may perhaps be greater than any given amount of dredge material.

When you consider that 90 percent of all of the total of the material being dumped in the ocean is dredged material, it would seem to me that was a priority matter that required our attention first.

With respect to the rest, I can assure you we have under advisement the possibility of a lawsuit in those areas.

Mr. LEGGETT. And essentially what solution do you see for the various ocean outfall terminations?

You indicate that currently the pipes that are discharging into the ocean ought to be closed off to comply with the act or the material ought to be tertiary and perhaps treated three or more times in addition before it is discharged.

Exactly how is that to be accomplished?

Mr. KAMLET. I do not know that I was suggesting either of those options, Mr. Chairman.

I think it is not outside the realm of possibility to require that wastes discharged to the ocean be presented in order to remove primarily persistent toxic chemicals that might have a long-term impact on the ocean.

Most treatment that takes place now, without distinction as to whether the discharge is to the ocean or to inland waters, is primary or secondary treatment. That is much more meaningful in terms of the biodegradable organic wastes that are present in the sewage, when there is a discharge to a confined inland waterway.

It may be without a great increase in expense, more appropriate alternative treatment techniques can be applied instead. That is with respect to pretreatment of the wastes before discharge into the ocean.

In addition to that, and I think no less important, is the need to consider that all of the municipalities, the hundreds or thousands of them throughout the United States that do not have the benefit of an ocean nearby in which to discharge their wastewater and sludge, are somehow managing, and not all of them are managing by discharging those wastes into the lakes and rivers.

It seems to me that there are alternatives available. That was the expressed finding of Administrator Train, following an adjudicatory hearing that lasted for 2 weeks and heard from dozens of expert witnesses on the question of alternatives as well as the question of impact on marine environment.

It seems to me that ocean discharge or ocean dumping should be a recourse of last resort rather than a recourse of first resort which we feel it often is.

Mr. LEGGETT. That is a good answer.

Now, is solid waste being discharged any longer?

Some of our statistics indicate that has been terminated.

Let me ask you this. Is garbage still being towed out to sea?

Mr. KAMLET. It is my understanding that there is no garbage presently being ocean dumped.

I know that in one of the annual reports filed by NOAA, I guess the one previous to the most recent report they filed, in a very prominent place on the second page of the report there was a picture of a barge superimposed against the skyline of New York, an open barge full of garbage. And the caption suggested this material was being taken to an ocean dumping site.

Well, it turned out—and I pursued this and called this to NOAA's attention—that these barges were not taking this garbage out to sea at all; they were taking the garbage to landfill sites on Staten Island and various other places.

I have seen since that time that same photograph show up with the same erroneous caption. But my understanding is that there is no longer any garbage being ocean dumped.

Mr. LEGGETT. The garbage scows are still coming in rather than going out?

Mr. KAMLET. That is right.

Mr. LEGGETT. Mr. Forsythe?

Mr. FORSYTHE. Thank you very much, Mr. Chairman.

Mr. Kamlet, I thank you for a very helpful statement. I have no questions.

Mr. LEGGETT. Mr. Perian?

Mr. PERIAN. Mr. Murphy has some questions, and I will give them to you after the hearing and you may respond later.

Mr. KAMLET. I will be glad to do so.

Mr. LEGGETT. Any other questions?

Very good. We thank you again very much.

#### QUESTIONS FOR KENNETH KAMLET AND ANSWERS THERETO

1. As the Act is worded, ocean dumping must not be allowed unless it can be proven to have no harmful effect on the marine environment. In other words, ocean dumping is presumed to be harmful unless proven otherwise. Do you think that this emphasis is valid? Should the ocean be viewed as a last resort, after all efforts to dispose of wastes on land and in the air have been

exhausted? Or should ocean disposal be considered as real an alternative as other means of disposal?

2. Do you think that total elimination of all ocean dumping is a realizable goal? What steps would have to be taken to reach that goal?

3. What alternatives to ocean dumping do you know of that have been considered, either by the government, industry or university research?

4. When looking for alternative locations to dispose of wastes, would it be fair to say that the ocean is the ultimate sink for the disposal of wastes, because wastes disposed of on land end up reaching the ocean through run-off into rivers and streams, and wastes disposed of in the air through incineration end up reaching the ocean through precipitation?

5. Without regard to the wording of the Act, is it reasonable to apply the same criteria to dredged materials which have probably been lying on the seabed for years and municipal or industrial sludge which may have more active contaminants? Because of their different nature, shouldn't they be handled differently?

6. Given certain very real budget constraints, do you think that there is any more that EPA could be doing in the administration of this Act?

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#### ANSWERS TO QUESTIONS FOR KENNETH KAMLET

1. We believe the statutory emphasis is valid, that the ocean should be viewed as a disposal medium of last resort, and that ocean disposal must not be regarded as on a par with other means of disposal.

This view is based on considerations relating to the ocean's vital importance to man, the avoidable nature of ocean dumping practices, and the impact that our decisions today will have on the ocean's future for many years to come.

Four-fifths of the world's animals live in the ocean and marine plants account for 50 to 80 percent of the earth's annual plant productivity. The vast majority of these animals and plants are concentrated in the relatively limited ocean waters adjacent to the world's coastlines. It is in these same areas that the pollution impacts of human activities are most profound. Ocean dumping is one more of many man-related insults to the coastal marine environment. It differs significantly from the many wastes that enter the ocean through transport by rivers and the atmosphere both in being direct and in being directly preventible. As long as the ocean is viewed as acceptable for direct use as a sewer, it is doubtful that progress can be made toward eliminating indirect sources of pollution as well. We must start somewhere. Ocean dumping is the most blatant form of ocean pollution. It deserves first attention.

As we noted in our testimony, the ocean dumping law does not require an end to ocean dumping regardless of consequences to other components of the environment. It simply demands that, before this valuable common heritage of all mankind may be used as a waste receptacle, it must be demonstrated that no more acceptable alternative exists. We believe this approach is not only appropriate, but commendable.

2. We believe that total elimination of all ocean dumping is a realizable goal. We do not believe, however, that the ocean dumping law requires that all dumping be ended, or that an end to all ocean dumping is either necessary or desirable. Certainly, all harmful or potentially harmful dumping should be terminated and terminated as rapidly as possible. Totally inert wastes, on the other hand, can probably in some instances be used to advantage in the ocean (e.g., to improve fish and shellfish habitat). And, it is certainly conceivable that substances such as nutrients could be added to ocean waters under conditions that might enhance marine productivity without impairing the ecological balance.

In terms of "steps" to be taken to achieve the elimination of harmful dumping, we believe that EPA and other concerned agencies of government must accelerate their research on and development of alternative waste management technologies (including, in particular, those aimed at reclaiming and recycling resource values). At the same time, we believe that EPA and the Corps of Engineers must begin to confront dumpers with strict termination deadlines and with stringent environmental protection requirements, in order to motivate dumpers to develop and implement alternatives on their own.

3. Feasible alternatives to ocean dumping exist in almost every instance. The specific alternative of choice will, of course, vary from situation to situation.

In the case of sewage sludge, for example, the following alternatives have all been suggested as alternatives to ocean dumping by the City of Philadelphia: (a) the Barber-Colman PURETEC acid wet air oxidation process (a high-temperature, high-pressure process for destroying sludge organics, and recovering and reclaiming sludge nutrients and heavy metals); (b) land application of stabilized solids slurry by plow-in procedures; (c) land application of stabilized solids cake by trenching procedures; (d) land application of stabilized solids cake by spreading and incorporating; (e) land application of stabilized composted solids cake; (f) conversion of sludge to anhydrous and liquid ammonia with heavy metal removal; (g) use of sludge for reclamation of surface-mined land; (h) I.U. Conversion Systems process for converting digested sewage sludge into a cement-like landfill material which is impervious to the leaching of heavy metals and other sludge constituents; (i) USDA Agricultural Research Service (Peoria, Illinois) starch xanthate process for removing heavy metals from wastewaters; (j) UCLA process for combining powdered dried sludge with powdered glass to form a slate- or tile-like material which is a suitable and low-cost substitute for roofing or bathroom tile; (k) proposals developed by several consulting firms for transporting U.S. sewage sludge to locations in the Middle East, Africa, and the Bahamas where it is needed and wanted for soil reclamation; and (l) multiple-hearth incineration with later conversion to pyrolysis.

In the case of ocean dumping of acid-iron wastes produced in the manufacture of titanium dioxide pigments (e.g., by DuPont and M.L. Industries), the following are among the available alternatives: (a) upgrading of the titanium content of the raw ore to reduce the quantity of waste material which must be discarded; (b) recovery and sale of ferric chloride; (c) recovery and sale of hydrochloric acid; (d) recovery and sale (or reuse) of chlorine; and (e) neutralization and landfill.

In the case of ocean dumping of concentrated chlorinated organic wastes (e.g., as formerly practiced by the Shell Chemical Company), high-temperature incineration (either on-land or at-sea) is the alternative of choice. In some cases (e.g., with herbicides of the sort stockpiled by the U.S. Air Force) reformulation-reprocessing may be indicated.

4. It is true that the ocean is an ultimate waste sink and that, until we clean up our rivers and our atmosphere, the ocean will continue to be polluted from these sources. These are relatively diffuse sources, however, in contrast to such direct and concentrated sources as ocean dumping and oil spills. While the long-range objective must be to reduce and eliminate pollution inputs to the ocean from all sources (e.g., by encouraging more efficient use and re-use of resources), the immediate task should be to eliminate the direct sources, and to do so in a way that avoids the indirect return of these wastes to the ocean through another route.

5. The question assumes that polluted dredged materials when dumped in the ocean will somehow be less "active" than municipal and industrial sludge. It is by no means clear that this is so. Although preliminary research conducted under contract to the Army Corps of Engineers suggests that the only "toxics" normally released from dredged material into the water in significant amounts are ammonia and manganese, virtually no research has been done on the availability to bottom-dwelling and filter- and deposit-feeding organisms of heavy metals and organochlorines that remain associated with ocean-dumped dredged material when it settles to the bottom. It is quite conceivable that biological action can free many toxic chemicals from their otherwise close associations with sediment particles and render them "available" both to produce direct toxicity to marine organisms and to be incorporated in the food chain. The only "activity," therefore, that is meaningful is biological availability, and there is no reason to believe that pollutants associated with dredged material are not biologically available.

Unless pollutants associated with dredged material are shown to be biologically unavailable, it would be anomalous and self-defeating to accord more liberal ocean dumping treatment to dredged material than to the municipal and industrial wastes which contaminate it.

6. Yes, very definitely. EPA could be tightening up its regulations to conform to the law; it could be requiring of dumpers a more searching review

of alternatives; it could be requiring of dumpers more comprehensive pre- and post-dumping screening and monitoring; and it could be imposing on dumpers for whom acceptable alternatives may be just out of reach, action-forcing phase-out schedules and implementation requirements.

We next have two witnesses who will testify together. We have Dr. Michael A. Champ, department of biology, American University, Washington, D.C., and Dr. Ferenc Szucs, geology department, Slippery Rock State College, Slippery Rock, Pa.

I understand you have some slides to show us.

**STATEMENT OF DR. MICHAEL A. CHAMP, ASSISTANT PROFESSOR OF BIOLOGY, AMERICAN UNIVERSITY, WASHINGTON, D.C.; ACCOMPANIED BY DR. FERENC SZUCS, GEOLOGY DEPARTMENT, SLIPPERY ROCK STATE COLLEGE, SLIPPERY ROCK, PA.**

Mr. CHAMP. I had proposed to show the committee a few slides to give you an overview of ocean dumping from behind a barge, to give you an idea of what someone riding on a tug does not see.

Mr. LEGGETT. Very good. Maybe the committee could move down there so the audience would not have to move.

Mr. CHAMP. I am Michael A. Champ of The American University, Washington, D.C., and this is Dr. Ferenc Szucs of the Slippery Rock State College of Slippery Rock, Pa.

Mr. Chairman and committee members, I would like to show you a few slides from ocean dumping studies conducted by the Marine Science Consortium off the Delmarva Coast at Du Pont and Philadelphia dump sites, and show you a few slides of studies conducted in the New York bight. Slide (1) shows the study area and dump sites.

Slide (2) is the du Pont barge, the *Edgemore I*. It is a barge that is designed to carry 1.25 million gallons of sulfuric acid or hydrochloric acid wastes.

This barge is radio-controlled. It is towed by a tug approximately 500 yards ahead. The barge is towed down Delaware Bay out to a site that is approximately 36 nautical miles southeast of the mouth of the bay.

This barge, upon entering the regulated dump site is activated by a radio remote control, and begins to dump the acid wastes.

Mr. LEGGETT. No people onboard the barge?

Mr. CHAMP. No, none whatsoever.

This waste has a pH of 0.01. It is extremely toxic. The waste is discharged behind the barge over 7 to 8 nautical-mile path. Slide 3 is the R.V. *Advance II* in the wake of the acid dump.

The waste in the water column disperses in a zone of discoloration. It is not necessarily a slick.

The waste will disperse approximately 1 mile across and approximately 7 to 8 miles long under their dumping regime.

Slide 4 will illustrate now the dump is a zone of discoloration and not a surface slick.

As you can see, this waste is green when it first is discharged. It begins to turn to a brown color because, ferric hydroxide, commonly called rust is formed.



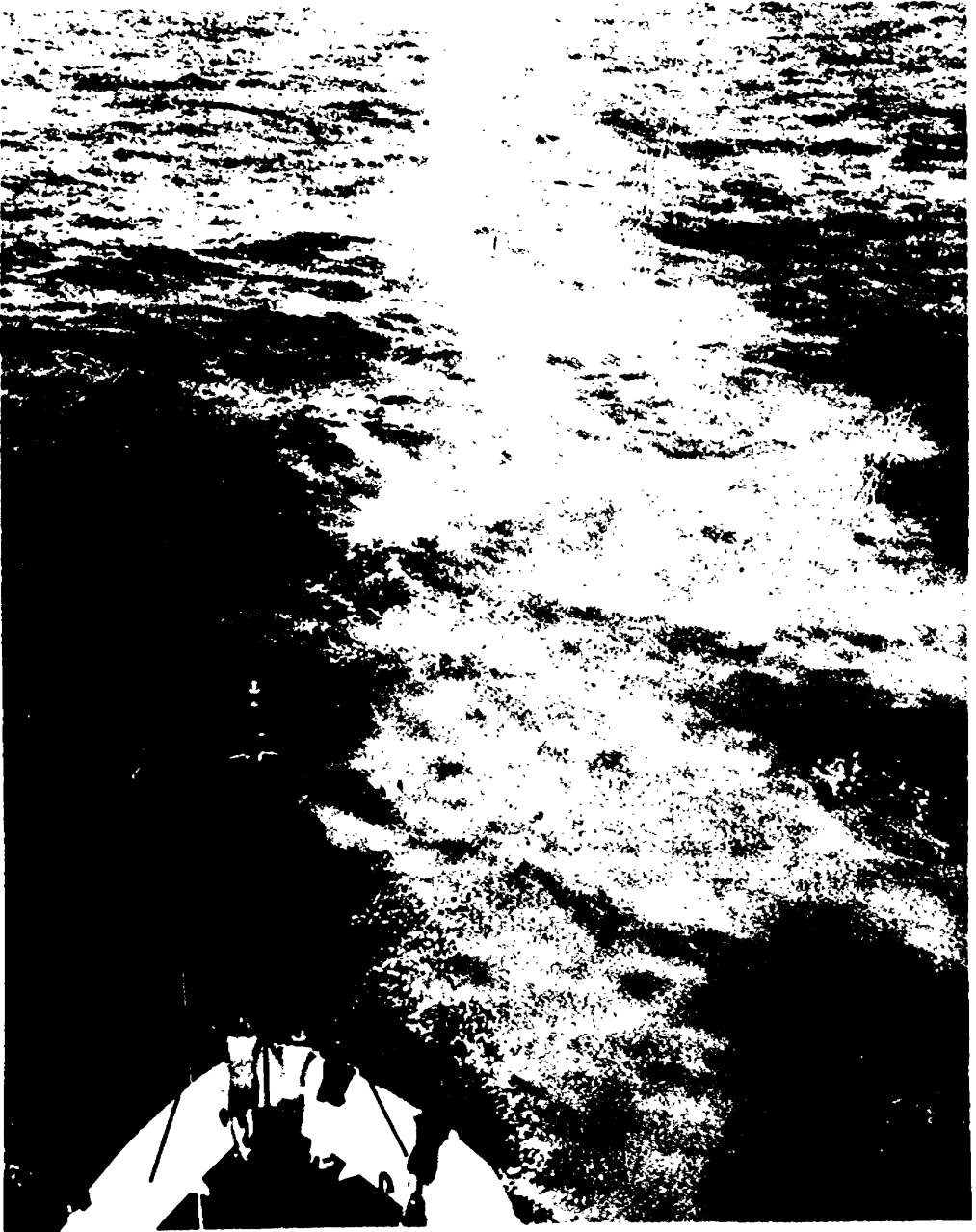
**SLIDE 1—Location of Dumpsites in the Mid-Atlantic Bight; Study Area for Operation SAMS: Sludge Acid Monitoring Survey, August 1973, The Marine Science Consortium**



**SLIDE 2—DuPont Barge Edge Moor-1 being towed into the DuPont Acid Waste Dump Site by the Tug Ocean Tower**



**SLIDE 3—R. V. Advance II in wake of DuPont Acid Waste following initiation of ocean disposal of 1,000,000 gallons of sulfuric acid iron sulfate wastes (July 1973)**



SLIDE 4—Lateral Dispersion of DuPont Acid Wastes perpendicular to direction of discharge (eddy diffusion) August 1973



This material will make a zone of discoloration approximately 8 to 10 miles long and approximately 1 mile wide.

We have found that the pH in this waste is as low as 3.9 behind the barge whereas the normal pH of seawater is approximately 8 to 8.3.

The low pH causes a tremendous stress to an area that is approximately 10 by 1 mile. We found that 76 percent of the phytoplankton species were killed immediately; with a decrease of 84 percent of the total species within 3 to 4 hours. The fish that we placed in bioacid tests, also died. I will go to those experiments in detail in a minute.

The studies we have conducted to date have tried to map the dispersion and transport of the waste material in the water column.

We have taken water samples from five selected depths from the surface, and this is station No. 14 [slide 5]. We are looking at filters that have filtered [one liter of seawater] from the selected five depths [surface to the bottom].

The interesting thing to note is that these samples above the thermocline or the 15 meter depth contains the iron waste and the bottom samples are relatively free.

In the ocean we have, what we call stratification where we have two water masses of different temperatures. They act as barriers. The waste is held on the thermocline and supported in the upper barrier water mass as indicated here.

We have been trying to map the dispersion of this cloud, and we are using optical methods here to trace it [slide 6]. An Alpha meter, has been used to trace the dispersion of this waste. We even see a depression of the thermocline in the right hand corner.

Mr. LEGGETT Now, those samples were taken immediately after the discharge?

Mr. CHAMP. Yes.

The point I need to address here is that our sampling approach has been: before, during and after dumping, studies.

For before, we go in and establish a control condition prior to the barge coming on to the site. The barge dumps. We follow behind the barge, and take discreet samples in time and space from the same water mass.

Then we are able to follow the dispersion characteristics with time.

Slide 6 contains data that is 2 hours and 45 minutes after the dump, and you can begin to see now a drift of the acid waste to the right corner here which would be the southwesterly drift.

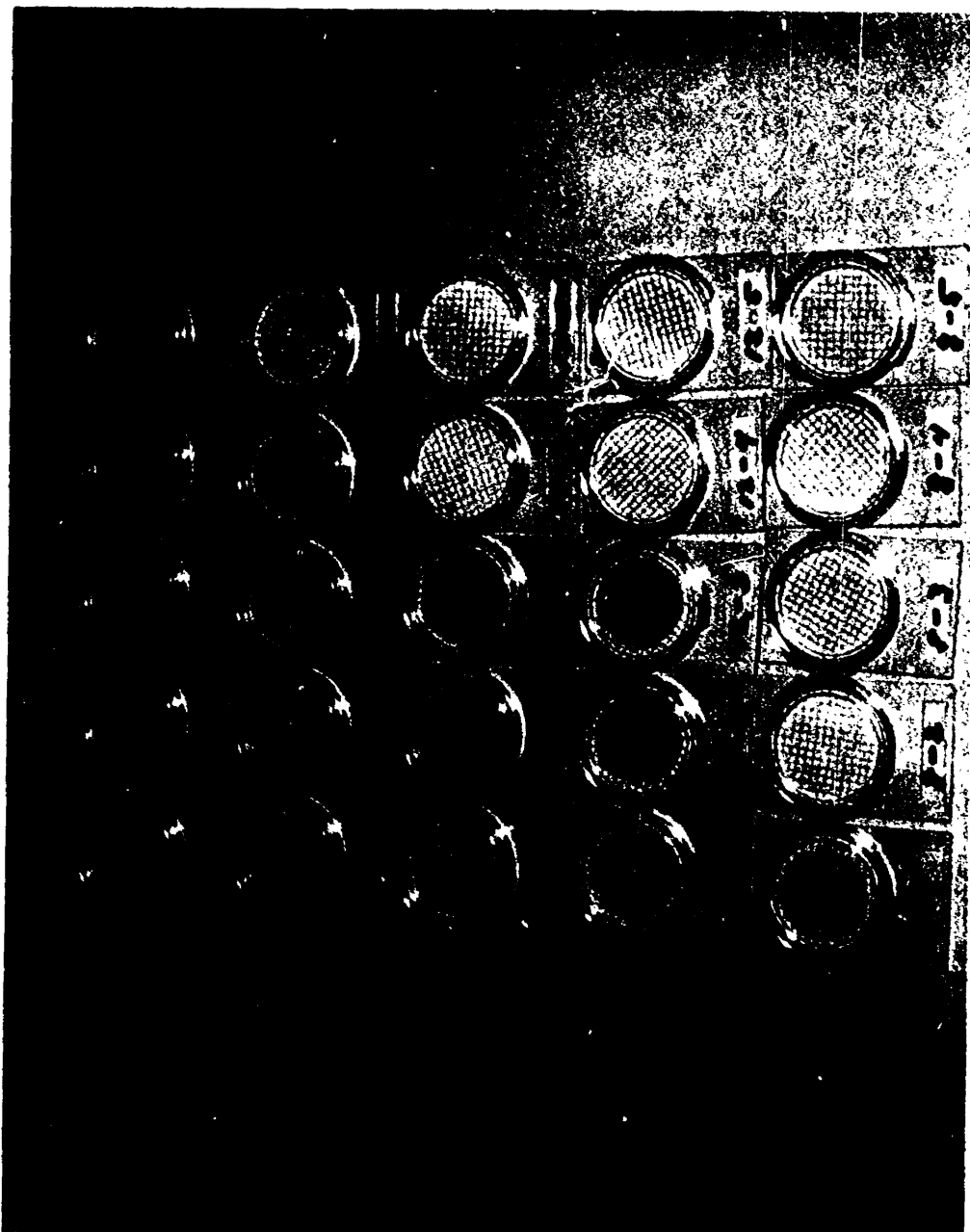
In one of our studies, we designed some special bioacid cases, hardware cloth measured cases, [slide 7] approximately one meter volume. We designed them to float in the surface water in a controlled site or in a dump zone of discoloration [slide 8].

The objectives here are sample the natural flora and fauna at the dump site and place them in the cages.

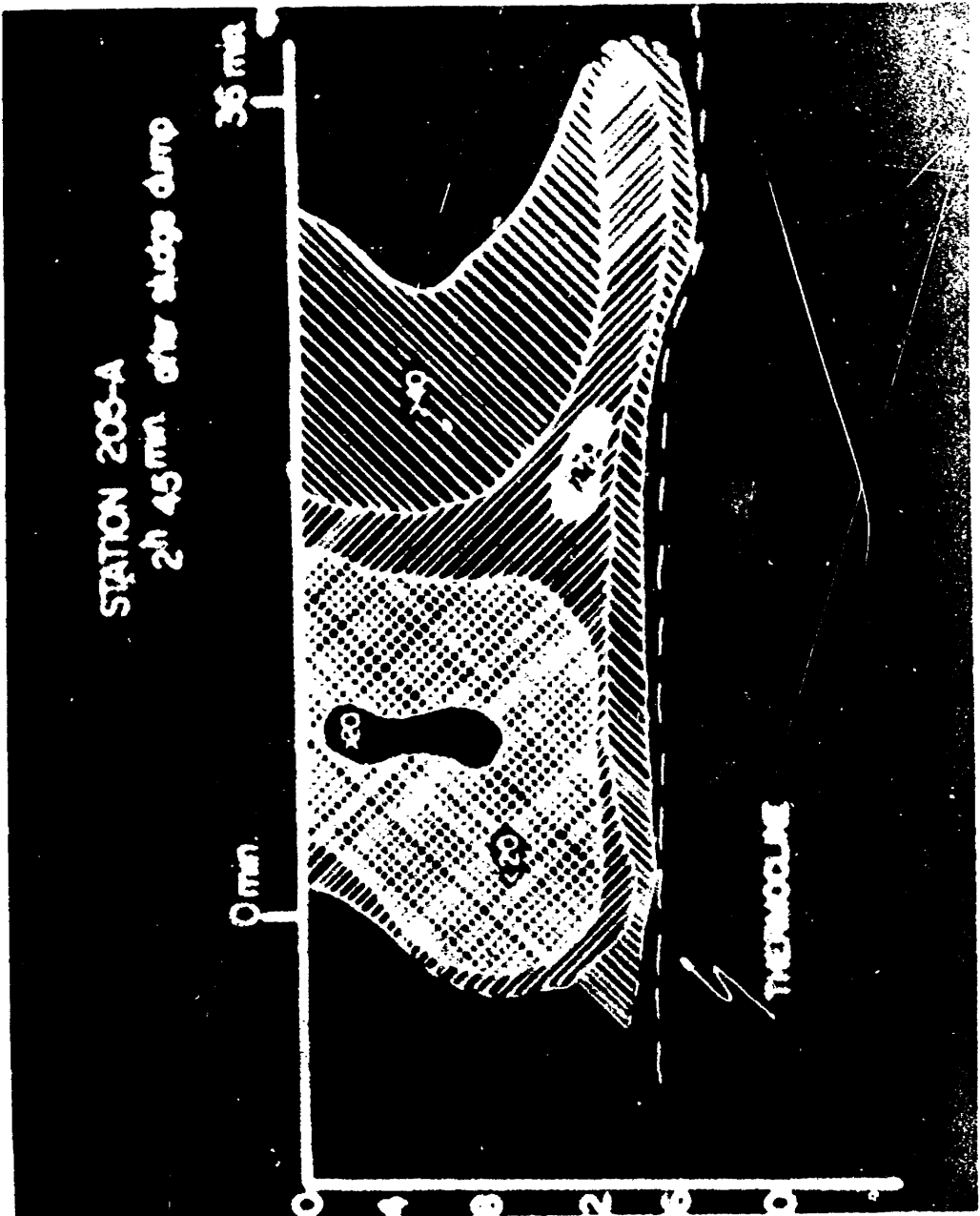
Here we were doing studies on plankton, and selected species of fish, placing them in these special cages; with control cages outside the dump site, and others in the zone of discoloration.

Mr. LEGGETT. Who finances your studies?

**SLIDE 5—Millipore Filters (0.45m) in plastic holders containing particulate for sea water samples from selected depth from surface to bottom (40m) collected for particulate biological iron analysis; Station 8 before dumping (control), Station 12 (8 hours), Station 13 (11 hours, 35 min), Station 14 (14 hours, 51 min) and Station 15 (18 hours, 26 min). Note presence of iron hydroxide flock on filters from the first three depths—those above the thermocline**



SLIDE 6—Percent transmittance Data, Kahl (GM Manuf.) Transmissometer, from transect across the zone of discoloration 2 hours and 45 minutes following ocean disposal of DuPont Acid Wastes illustrating vertical and horizontal dispersion and distribution above the thermocline (Operation SAMS II, August 1974)

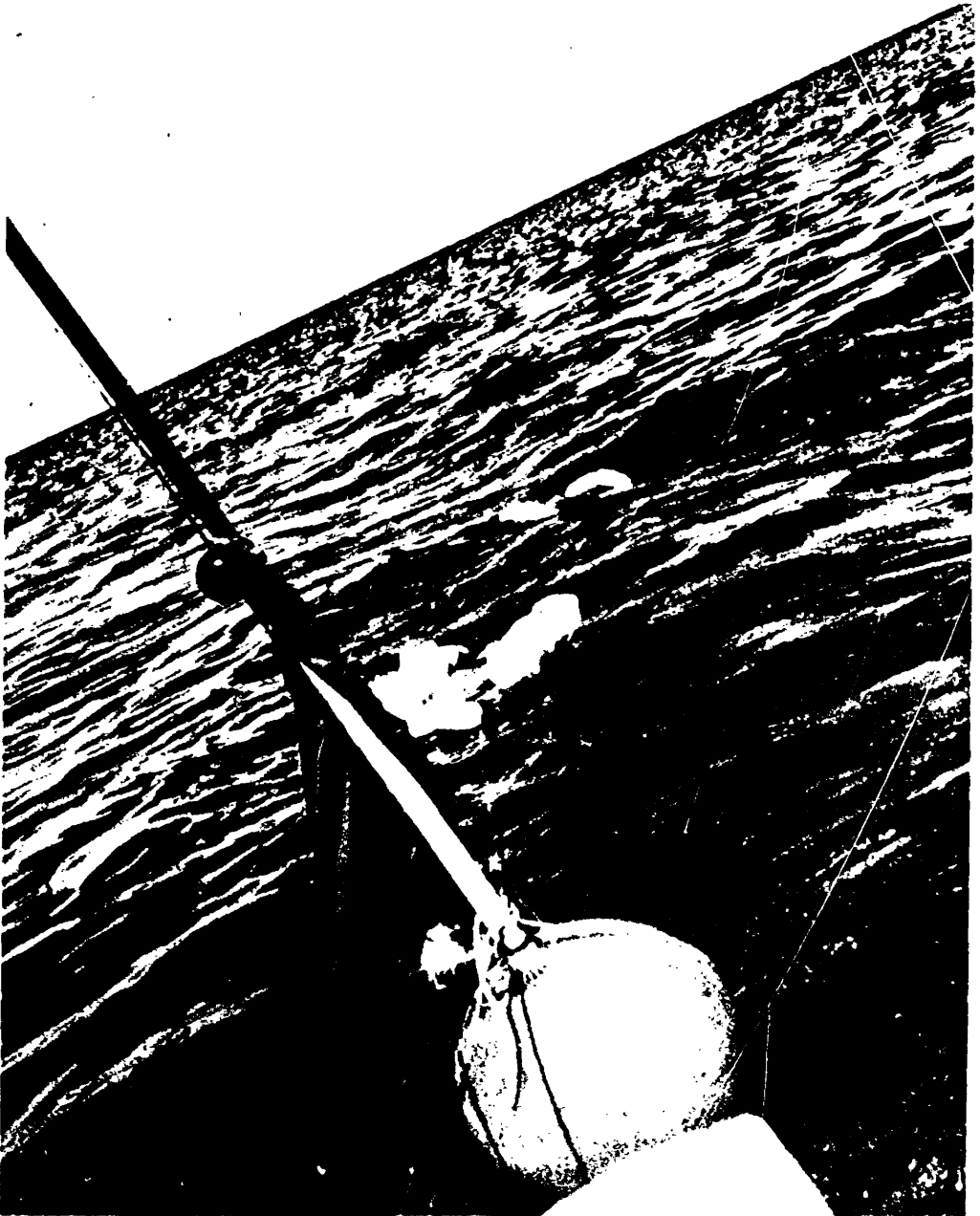


SLIDE 7—Hardware cloth bio-assay cages





SLIDE 8—Bio-assay cages floating in the surface water mass



Mr. CHAMP. Our studies have been financed by several sources over the past 4 years. Approximately \$45,000 has come from the marine science consortium, which is a conglomerate of 18 universities across the northeastern part of the United States.

Approximately \$90,000 has come from Federal and other sources, of that \$90,000 approximately \$60,000 from the city of Philadelphia.

The specimen shown here is a skate that has been placed in the cage [slide 9]. The cage has been placed in the zone of discoloration of an acid dump.

As you can see from the slide, the skate is dead. Other bioassay studies were conducted, aboard ship in special tanks, such as shown here, and you can see the starfish in the top two corners [slide not reproduced].

We would then, as we follow the barge, pump actual seawater from the zone of discoloration into these tanks and, therefore, be studying the condition in which the organism would experience if he had been in that watermass that the barge dumped the acid waste in.

We found all the fish in our fish bioassay experiments died. The ones particularly aboard the boat died within 15 minutes. We found their gills were clogged with the flocculant material [slide 10].

They had various sporadic behavior also. We did not investigate the physiology of the death or actual cause of death.

We were mainly trying to measure actual toxicity in the mining zone that has been lacking in previous studies.

Mr. LEGGETT. Were these fish you had planted in the area?

Mr. CHAMP. Correct. We trawled these fish up in the area prior to the bioassay experiments and then placed them in cages or in aquariums aboard the ship, within 15 minutes after the initiation of dumping.

Mr. LEGGETT. Did you net any fish that were natural in the area?

Mr. CHAMP. That is correct. We are trying to use natural endemic species of the area.

Mr. LEGGETT. Did a lot of fish die and float to the surface that were just in the area?

Mr. CHAMP. No.

Mr. LEGGETT. Why was that?

Mr. CHAMP. I think part of this is the sensitivity of the fish to migrate out of the wake of the barge. I am sure the young fry do not have either the speed to move out of the area or possibly the sensitivity. Part of this may be the waste is holding up above the thermocline and part of it may be sensitivity to migrate away from it. However, a fish placed directly into pumped seawater containing acid waste does die within 15 minutes following ocean disposal.

We also did studies on the metabolism of phytoplankton. We are looking at the impact on food chain components.

We are doing light and dark bottle studies, using radio isotopes and seeing if the industrial or municipal waste in any way alters the photosynthetic rate of the phytoplankton [slide 11].

We are trying to determine, the effect, on the lower levels of the food chain rather than measuring a bioassay value such as brine shrimp.

SLIDE 9—Dead Skate (*Raja eglanteria*) in Hardware cloth bio-assay cage following exposure to acid wastes



SLIDE 10—Dead Bio-Assay Fish (Silverhake, *Merluccius bilinearis*) exposed to seawater containing DuPont Acid Wastes illustrating encrustment of ferric hydroxide inside on the gills and gill chamber



SLIDE 11—Light and dark bottle carbon-14 uptake studies to determine the impact of ocean disposal on phytoplankton photosynthesis rates



These are placed on buoys, placed in controlled areas, and also in dump areas. They are placed for approximately 12 hours after a dump. We pick up the buoy, filter the water sample and determine the photosynthetic rate of the phytoplankton.

One of the interesting observations is the damage to our research vessel working in the acid wastes, either the New York Bight or the Mid-Atlantic Bight in acid wastes dumping areas.

These are the heat exchanger rods that go in the engines cooling system aboard the ship [slide 12]. These rods on the right are brand new rods.

Over here on the left, are rods that would have been in less than 3 to 4 days while the ship was operating in the acid waste, and this is an heat exchanger rod that has been used for a few hours in the dump area.

The research vessel we used for this research is owned by the Cape Fear Institute of Technology, and she sustained \$6,000 worth of damage to the bottom and some engine components—personal communication, Captain Arthur Jordan, CFIT.

The other slides I want to show you are from sewage sludge dumping [slide 13].

Here is a slide of the city of Philadelphia sewage sludge dump [slide 14]. You see the sheen across the top of the water. This is actually a slick.

The smell from this is just incredible. We found, on following the slicks, that it is very easy to lose them because they settle rapidly.

Sometimes we are very fortunate to get one for a couple of hours if the dump is early in the morning and you can stay with them during daylight.

Mr. LEGGETT. Is that from a barge?

Mr. CHAMP. Yes, there are current drogues in the water with radar reflectors on them, are placed at different depths to follow the dispersion of the wastes in different water masses.

If in fact the slick becomes not visible due to weather or darkness we can locate the water mass by following the drogue and be able to take our samples for chemical analysis.

That is the last of the slides I have for you. Possibly, if there is time, I would like to go back to my testimony and pursue a couple of items I have here.

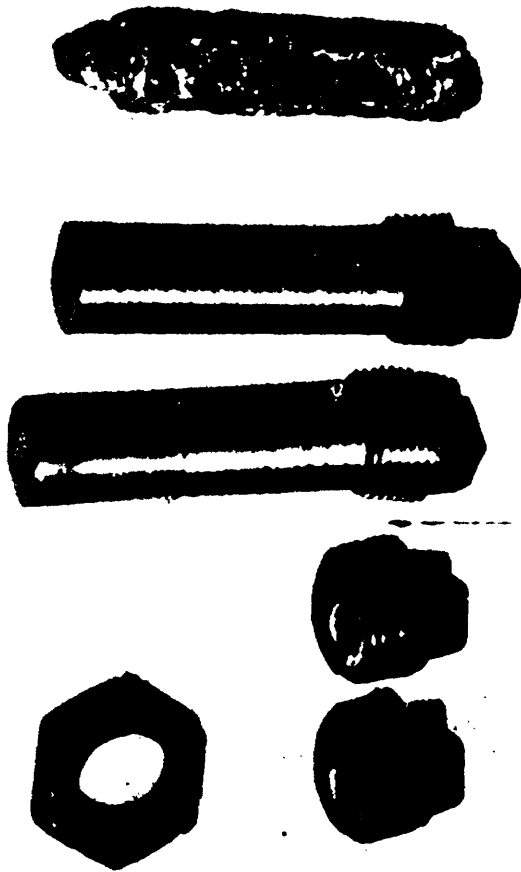
Mr. LEGGETT. You may proceed.

Mr. CHAMP. I am an assistant professor of biology at The American University, Washington, D.C. and vice president of research of the Marine Science Consortium, a consortium of 19 colleges and universities from the Eastern United States. This year, I am on leave of absence to be the resident scholar of the Board of Engineers for Rivers and Harbors of the U.S. Army Corps of Engineers. My testimony today reflects my personal opinion and is not the official position of the aforementioned.

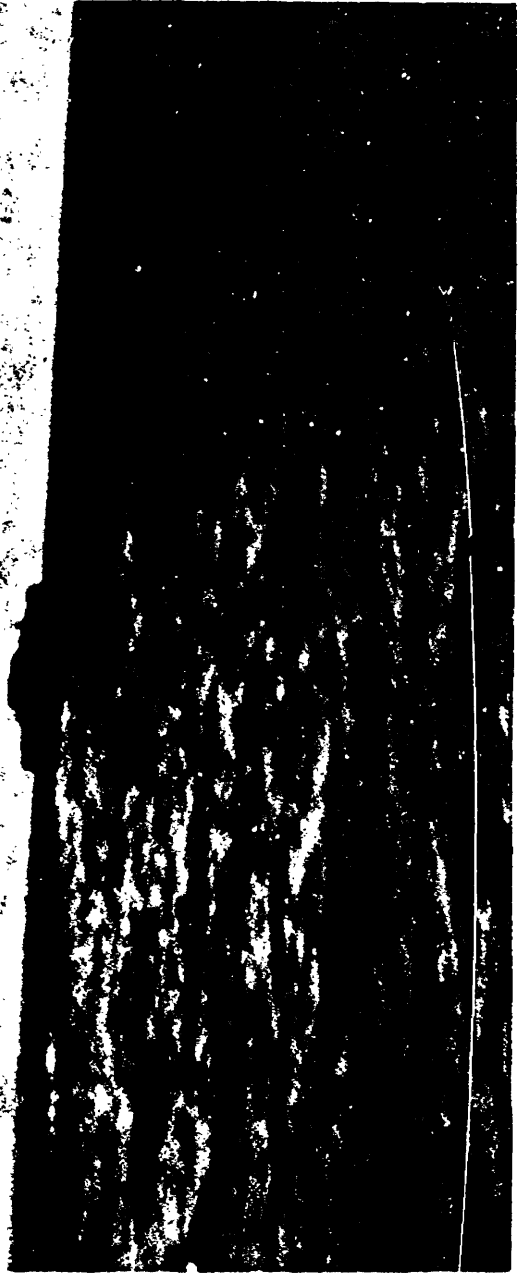
During the summers of the last 3 years, The Marine Science Consortium has conducted marine pollution research cruises as a special 3-week graduate course. To date, I have been chief scientist for three of these research cruises: (1) Operation SAMS: Sludge and Acid Monitoring Survey, August 1973 (a chemical, physical, and biological

**SLIDE 12—Corrosive damage to zinc electrodes in the engine sea water cooling system of the R. V. Advance II following intake of sea water containing ocean disposed DuPont Acid Waste**

**The first and second electrodes (from left) have been totally erroded in less than 3-4 days following two acid dumps. Electrodes three and four are new-unused while number five has been in use in the dump site area only a few hours.**

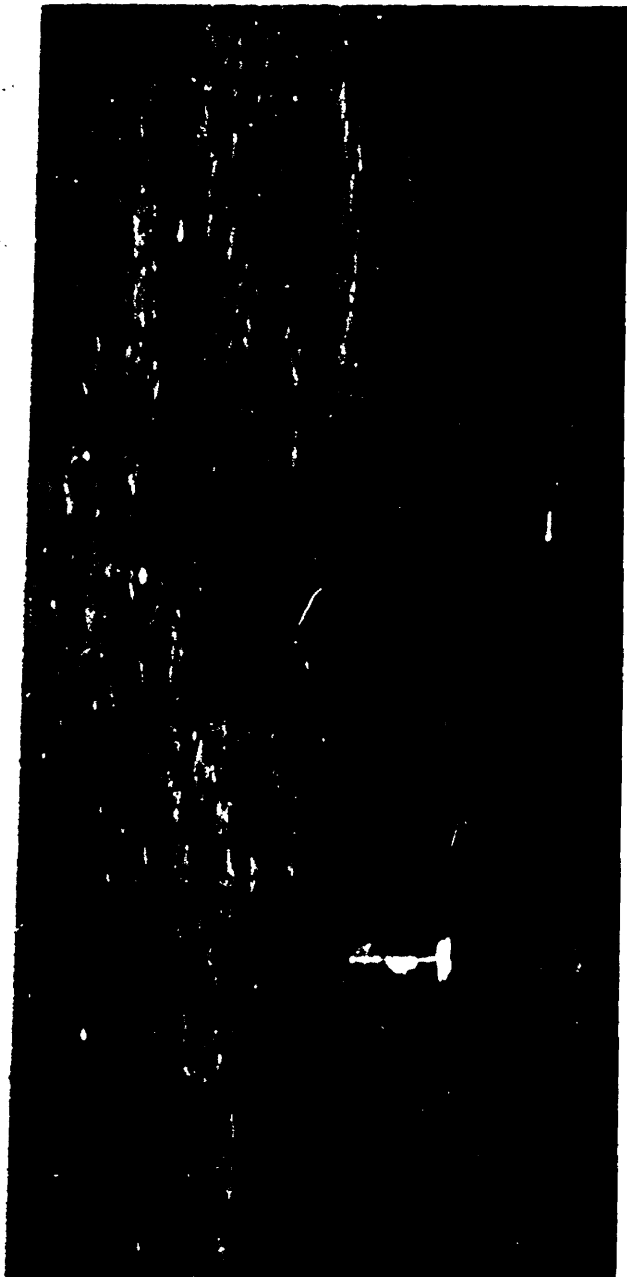


**SLIDE 13—Barge-Ocean disposal of sewage sludge by the City of Philadelphia.  
(IDRES, 1974)**





**SLIDE 14—Surface slick of ocean disposed City of Philadelphia sewage sludge with current drogues to track dispersion**



cal research cruise investigating the effects of acid wastes and sewage sludge ocean disposal at the du Pont dumpsite and the city of Philadelphia sewage sludge dumpsite of the Middle Atlantic Bight; (2) Operation MIDOS: Municipal and Industrial Dumping Oceanographic Survey, July 1974, a chemical, physical, and biological survey of all the different types of ocean disposal in the New York Bight; and (3) Operation SAMS II, August 1974, a repeat cruise of SAMS I to verify previous findings and to conduct special bioassay studies.

The Marine Protection Research and Sanctuary Act, approved on October 23, 1972, assigned significant responsibilities for initiating or promoting research related to ocean dumping and other man-induced changes to ocean ecosystems. Title II contains three operative sections as well as a section authorizing funds to fulfill the purposes of the title:

Section 201 provides for a comprehensive and continuing program of monitoring and research regarding the effects of ocean dumping.

Section 202 calls for a comprehensive and continuing program of research with respect to the possible long-range effects of pollution and man-induced changes to ocean ecosystems.

Section 203 states that the Secretary of Commerce shall conduct and encourage research and other activities to determine and demonstrate means of minimizing or ending of dumping of materials within 5 years of the effective date of the act.

The basic purpose of Public Law 92-532 was to put an end to unregulated dumping of material into the ocean. This was to be accomplished by requiring that the disposal or the transport for disposal of waste material into U.S. territorial waters be within a few exceptions enumerated in the act subject to a permit system to be established and administered by the Environmental Protection Agency. The act preserved the basic authority of the Corps of Engineers to maintain responsibility for the disposal of dredged spoils and to develop regulations for evaluation of permit applications, and to issue permits, after notification to the EPA Administrator, for dredged material. Currently, dredged material represents 80 to 90 percent in tonnage of the total amount of waste disposed in U.S. territorial waters.

To carry out the monitoring requirements of section 201 of the Marine Protection Research and Sanctuaries Act, EPA and NOAA have proposed a program of surveys and evaluations of individual dump sites which will center around baseline surveys. This program envisions an initial baseline survey of each site carried out on a quarterly basis under a multiple-year period, which will be followed by annual monitoring of each site thereafter. The baseline surveys are designed to provide significant data to assess the environmental impact of previous dumping practices and to provide a data baseline against which future surveys can be compared. A dump site survey will involve determination of (a) geophysical characteristics of the sea floor; (b) description in abundance of the benthic biota (fish, shellfish, epifauna, infauna, and bacteria); (c) description and concentration of selected contaminant materials in the sediment, in the benthic biota, and in the water column biota; and (4) physical characteristics of the water column.

These proposed baseline surveys will increase greatly our knowledge of selected areas of the marine environment. However, since ocean dumping has been going on in some areas for many years (for instance in the New York Bight, since 1948), it will be extremely difficult to reconstruct "prior to dumping status" of an area with controls stations, etc. in a baseline study. Baseline surveys measure the "status" of the environment for the period sampled. Nevertheless, it is desirable to conduct baseline studies for future reference. Also, they are the only means of assessing long-term effects. One companion study that is needed is the short term—immediate effects investigation. This is a before, during, and after dumping study of the actual ocean dumping of waste material. It is only through these short-term intensive studies that we can assess and predict the total impact of ocean disposal on the marine ecosystem. We need to understand the mechanisms involved in the interaction of waste materials with physical, chemical, and biological components of the ecosystem.

There are six major areas that extensive ocean dumping short term—immediate effects studies need to be conducted:

1. The dispersal and transport of ocean dumped materials;
2. The effects of ocean dumped materials on key forms of marine life (i.e., producers and consumers as well as those organisms of commercial value);
3. The metabolic pathways and rates of incorporation of ocean dumped materials in living systems;
4. Bioassay studies to determine the toxic levels that effect major life processes (i.e., respiration, metabolism or reproduction, etc.);
5. Impact of ocean disposal on the resiliency, stability, and recovery factors of marine ecosystems; and
6. Fate of pathogens in ocean dumped materials.

In the policy area of research and development, there is also a practice which I recommend be discontinued. EPA currently may require that an ocean dumper, in his interim permit, conduct special environmental studies. The findings from these studies are used by EPA in reviewing the next year's permits application. This is the old classic example of the "fox guarding the chickenhouse." The company should be required to pay an environmental assessment fee from which Federal agencies would fund baseline studies or special studies. This would prevent vested interests from directing, designing, or interpreting the findings of the study.

There is also a need for Congress to authorize an intergovernmental program to investigate the impact of ocean dumping of industrial and municipal wastes similar to the dredged material research program (DMRP). The DMRP was authorized by section 123(i) of Public Law 91-611, the River and Harbor Act of 1970. In May 1971, the U.S. Army Engineers Waterways Experiment Station (WES) was assigned to identify and assess the problems and to develop the research program. Funding for the DMRP was authorized in February 1973. WES initiated the planned 5-year, \$30 million research program in March 1973. The funding for each year is on a year to year basis and is contingent on production of results from research justifying continuation. The objective of DMRP is to provide definitive information on the environmental impact of

dredging and disposal operations and to develop technically satisfactory, environmentally compatible, and economically feasible dredging and disposal alternatives, including considering dredged material is a manageable resource.

Currently ocean disposal research is a "shirt sleeve"—piggy back—stepchild" operation as is handled by the various agencies involved. It is either a small part of a major study, i.e., MESA-New York Bight, or it is a piecemeal whenever-funds-are-available type operation, (i.e. EPA's program for the last 5 years). On May 21, 1974, a joint EPA-NOAA memorandum of understanding was developed concerning baseline surveys and evaluations of ocean disposal sites. However, to date this program on monitoring and research on ocean disposal as a provision of the Marine Protection, Research, and Sanctuaries Act of 1972 (Public Law 92-532, title II) has not developed. Particularly this joint program has not come about because "ocean dumping" as everyone knows will be "phased out in ?". However, with today's economic and energy crunches and the current level of ocean dumping research, one wonders if enough information will be available to make policy and decisions which will hold up in court.

The proposed ocean dumping research program could be developed from the EPA-NOAA joint memorandum of understanding by authorization of Congress as recommended by the House Committee on Merchant Marine and Fisheries. Much of the coastal zone research could also be housed in this program.

Mr. LEGGETT. You have been hired to coordinate and do some special studies for the Corps of Engineers.

Mr. CHAMP. Yes.

Mr. LEGGETT. And you think the corps, or EPA, or NOAA ought to be the agency to do this job?

Mr. CHAMP. I am not sure exactly how this should be handled because of the problems associated with one agency having regulatory responsibility and another agency having monitoring responsibility, and then the monitoring agency not keeping up its responsibility, I think maybe NOAA's lack of interest in this may indicate the level of funding available for such research.

Therefore, it might be feasible to set up a totally independent group to look at this strictly from a scientific research aspect rather than "firefighting" as EPA is currently doing.

Mr. LEGGETT. Of course, if we put a tax on this industrial discharge, which appears to be like 5 billion tons, let us say of \$5 per ton, that would collect a considerable amount of money with which to fund this program.

Mr. CHAMP. My recommendation here stems from the fact that essentially, the industries are borrowing the ocean, for oceandumping. This tax should be thought of as analogous to interest on borrowed money from a bank.

If this interest were large enough, maybe 10 percent as current market rates are, this tax would stimulate the development of other available alternatives, because ocean dumping would be less of a desirable economical alternative.

Mr. LEGGETT. Very good.

Well, your testimony is very helpful.

Mr. Szucs, I have reviewed your testimony while Dr. Champ was talking, and you make your recommendations on page 5 of your testimony, No. 1, in order to utilize more effectively available funds and other economic resources, there is a need for greater coordination of activities under the aegis of the Marine Protection, Research, and Sanctuaries Act.

You suggest coordinated approach by one agency ought to be identified.

No. 2, you say for a complete understanding of the complex marine environment, we must use systems analysis. You mention Doxiadis, the great Greek planner, noted that "We continue to be sidetracked into concentrating upon symptoms, missing the total picture."

You also say that ocean dumping, because of its high visibility, receives attention from both Federal and State agencies and the public.

All of this takes money, does it not?

Mr. Szucs. Yes, Mr. Chairman, it does take money, but the recommendations seek to keep this in mind. At present, we are unable to provide sufficient funds through these agencies because they are scattered and, in my testimony, I made some statements concerning the wastes, the funds that are required.

I think you would agree that if one agency were to carry out the purposes of the Marine Protection, Research, and Sanctuaries Act, it would have a greater weight in stating their case and acquiring sufficient funds.

Presently, these funds have to go through several levels. The departments control it, and out of the \$10 million designated to NOAA, for instance, only a few hundred thousand or less have been approved.

I do believe, then, that one agency could state its case much more forcefully and we would be able to scientifically accomplish a more meaningful job because presently, as I stated, the research efforts are divided.

Mr. LEGGETT. Now, did you find anybody out there with you behind the Du Pont scows monitoring the desecration of plankton at all?

Is there anything competitively being done by the Federal agencies at the present time?

Mr. Szucs. The Du Pont and Philadelphia dump sites have been surveyed by the EPA Region III.

In my opinion, as a scientist, I must question their results. They have not used the right methods, and their conclusions, therefore, are questionable.

Dr. Champ has emphasized the short-time survey (before, during, and after) dumping studies.

I would like to underline that there are methods to estimate and evaluate the long-term effect of those toxic materials, but neither the EPA nor NOAA had ever, to my knowledge, during their baseline studies, used the right method.

They go out and take sediment samples from the bottom of the oceans, and they analyze these in the form of a grid in the hope of

getting sufficiently far away from the dump site they would find background concentrations.

Now, in our studies, we have successfully used cores of different depths. This is a temporal approach. We can take several feet of cores which represent different time levels, and it can go prior to entire genetic interference with the environment. And we can have a much more meaningful understanding as to what are the forces of nature.

Most of the problems concerned with it, Mr. Chairman, we do not know what the forces of nature are. And many times the anthropogenic and natural efforts are intermingled.

No effort is being made to separate them and, therefore, we just go into court and present isolated cases.

In my view, we should look at the total environment and look at the natural background for analyzing the toxic metal content in these cores at the various levels.

In our studies in Lake Erie, as well as in the area of the Delaware Bay, we were able to show the fluctuations due to natural forces as well as the effluent since industrialization began. These are scientific facts that cannot be questioned.

While the efforts by EPA and NOAA go on, I must say, in all honesty, that they leave much to be desired.

Mr. LEGGETT. Very good.

We will level that charge at EPA and NOAA and see what they have to say about it.

What you are saying is that they do not take into account the thermal layer differences that you do in your testing, is that right?

Mr. SZUCS. I would believe that they do take that into consideration, but they do not take into consideration the natural background and do not separate where the material is coming from.

In my testimony, I made a statement that, for instance, in the New York Bight area, only 9 percent of the pollutants enter via ocean dumping.

All the rest, Mr. Chairman, is coming from outfalls and runoff and so on and so forth.

Now, previous testimony has already pointed this out, and if we enforce the law without, at the same time, carrying scientific research forward, we might end up with eliminating the ocean altogether but, at the same time, allowing the same toxic material or even more toxic materials to reach the ocean by outfalls.

Mr. LEGGETT. When you said 9 percent was by ocean dumping, you described that as sludge.

Did you also mean industrial sludge like this Du Pont sludge?

Mr. SZUCS. This is not sewage sludge. This is all kinds of contaminants, regardless.

Mr. LEGGETT. Mr. Mannina?

Mr. MANNINA. Thank you. Dr. Champ, you indicated in your statement that this acid water remained in the water column and is toxic to fish in the area.

Is it possible that these wastes spread out to a large geographic area and are toxic to fish over a greater range than you are testing in and, therefore, could possibly have an adverse effect on the existing commercial fishery?

Mr. CHAMP. I would say that is a correct assumption.

The problem here is we are talking about two types of toxicity.

One is the immediate toxicity from the acidity which is neutralized in about 4 hours.

The next level of toxicity is the ability to concentrate heavy metals in the food chain, and it's this type of bioconcentration that is carried closer to shore where it is more available to the food chains of organisms living in the coastal area.

Mr. MANNINA. Have you done any studies of how far this material spreads geographically?

Mr. CHAMP. We have a student who is doing a thesis on the distribution of iron in the Delaware area and has conducted special studies and could not find a control station in 6,400 square miles. This is an 80-by-80-mile grid across the dump sites. We could not find a background concentration in seawater for these stations.

We find that acid waste from previous dumps are still visible during calm weather—3 to 5 days—and we can still find them chemically in the water mass.

The research that we are doing here is; before, during and after the dumping studies, whereas some of the research being conducted by agencies is baseline research where, on a certain date, you go out and sample a transect or grid. The deficiency here is if a barge does not dump in your grid during the study, the agency does not have any data relating to the actual dump. They only have data relating to the site.

If the impact occurs mainly in the upper water column, they may have no record of it.

Mr. MANNINA. You said an 80-by-80 mile area.

How far out would you go to get a noncontaminated sample or a base sample?

Mr. CHAMP. Prior to our study I figured that 80 miles by 80 miles, would be enough. However, after we analyzed the samples, we found out, that our study area was too small.

An interesting thing to note, the interim criteria issued by EPA had a statement in it that certain metals could not be dumped more than one order of magnitude above background.

When they were issued in the Federal Register, there were many repercussions. Industry was able to secure a compromise where the limit would be 0.75 milligrams per kilogram weight of material dumped.

Therefore, if you want to dump more mercury, you get a larger barge.

Mr. MANNINA. Thank you.

Mr. LEGGETT. Very good. You can read the record back and study it.

Mr. PERIAN?

Mr. PERIAN. Dr. Szucs, on page 4 you state, "Our experiences in both the New York Bight and off Delaware Bay indicate that violations to dumping regulations are quite frequent."

Is that a general statement, or do you have specific information that you can provide to the committee?

Mr. SZUCS. We do have specific information, and Dr. Champ can back me on this.

The research consortium had gone into the New York Bight 2 years ago, and some violations were encountered.

Mr. CHAMP. In one of our particular cruises up there, 14 barges dump in about 24 hours in an area about 7 or 8 miles across and about 4 miles deep.

In the dark, many barges were dumping in adjacent areas trying to keep from hitting each other and unload and get out of there.

They come by in a string and dumped in any available area in the vicinity of the dump sites, in one case we had four or five dumps right on top of each other of different materials. It is very hard to go in and determine the discreet effects from one particular waste dump versus another when, in many cases, at night they were dumped adjacently.

The other thing, the city of Philadelphia, when they set up their barging operation, they were using river barges. These people had not been offshore before. They would get seasick out there, and short dump during rough weather.

On one occasion we were rendezving with a barge, and the weather turned bad and they dumped short, and we only found the dump on the way in after we gave up waiting.

We find it very hard to coordinate dumping studies in our first year with industry. For instance in one case a dump in the middle of the day, were we could photograph it, we didn't get the same concentration of material dumped as was dumped the previous night. It was a lighter material with more water in it and less acid.

It is really a difficult situation. It takes a lot of time to do these studies, and I think probably a \$20 million a year program is not a poor estimate of what the cost would be.

Mr. PERIAN. For the entire United States would you say 28 violations in 12 hours is normal?

Mr. CHAMP. No. I would say from this particular study we had 24 close dumps over a 24-hour period. Let me specify that most occurred at night, because it is a matter of them just all hitting in a very close area and trying to keep from running over you and all the other barges.

Also, in the New York Bight, you have a large charter boat fishing operation during the summer that fishes at night, and these charter boats line up and down the channels for several miles.

You have a tremendous number of boats in the area trying not to run over each other, and it is a matter of finding a place to dump and getting out of the area because it is congested.

Mr. PERIAN. Thank you.

Mr. LEGGETT. Very good.

Your testimony is very helpful to us.

Did you every try to coordinate with industry?

Mr. CHAMP. Oh, yes.

The only way we could actually get timing of the dumps from industry is to get it out of the barge operators.

Mr. LEGGETT. Now, of all of the dumps you claim were violated, they were all, I presume, pursuant to a permit, correct?

Mr. CHAMP. Right. However due to the closeness of the dump sites in the NY bight, it will be very difficult to identify violations at night.



Mr. LEGGETT. So, what you are saying is that they are not complying with the permits?

Mr. CHAMP. This problem exists in the New York Bight where you have dump sites that are 2 miles by 1 mile square rectangles adjacent to each other by a half mile. They are too close.

Mr. LEGGETT. Well, I am sure the conditions persist in many other areas besides just New York.

Mr. CHAMP. No. Primarily in the New York Bight. The Philadelphia, and Du Pont dump sites are separated and Du Pont is extremely careful about where it dumps.

The barge company dumping Philadelphia's sewage sludge has become more careful in recent years.

Mr. LEGGETT. Could you solve the Du Pont problem where you have got at 0.1 pH being dumped, say, by expanding the time of the dump?

Mr. CHAMP. Right.

Their original dumping rate was 18 to 20,000 gallons a minute. At earlier public hearings that were held in Rehoboth and other places on the Eastern Shore in 1973 and 1974, we testified against Du Pont, and we made a recommendation that lower the discharge rate to no more than 3,000 gallons per minute. They have since done that.

However, they are dumping in a four-leaf clover pattern and stacking the waste in the same area.

Mr. LEGGETT. Those wastes you filmed here, were those the 3,000?

Mr. CHAMP. Yes. The effect is it does not disperse physically as fast because you are just piling it on.

Mr. LEGGETT. Very good.

The statement of Dr. Szucs will appear in the record in full at this point.

[The statement referred to follows:]

DEPARTMENT OF THE ARMY,  
BOARD OF ENGINEERS FOR RIVERS AND HARBORS,  
Fort Belvoir, Va., July 24, 1975.

**BOARD OF ENGINEERS FOR RIVERS AND HARBORS ANNOUNCES  
APPOINTMENT OF RESIDENT SCHOLAR**

The Board of Engineers for Rivers and Harbors announces the appointment of Dr. Michael A. Champ as its Resident Scholar for the year July 1975 through June 1976. Dr. Champ, Assistant Professor of Biology and Director of Environmental Studies at the American University, Washington, D.C., and Vice President of Research for the Marine Science Consortium, will be on a year's leave of absence during his tenure as Resident Scholar.

The Board of Engineers for Rivers and Harbors, a review board established by law within the U.S. Army Corps of Engineers, employs a Resident Scholar annually to conduct special studies on high priority water resources problems. He acts as consultant to the Board, and conducts lectures and seminars for the Board's Planning Associates Program.

Dr. Champ received his Ph. D. in Biology from Texas A&M University. His interests lie in the fields of Limnology and Oceanography, with emphasis on water quality. He has studied organic and inorganic carbon cycles in ponds, lakes, rivers, estuaries, and on the outer continental shelf. He has conducted water quality studies on the Navasota and Trinity Rivers, Texas and on the Patuxent River, Maryland. He currently is investigating the impact of urban storm runoff on the Potomac River. Dr. Champ was a member of the USNS Eltanin Cruise 51, the Ecology of the Ross Sea, Antarctica, and he has served

as Chief Scientist for four cruises in the Atlantic Ocean during the past three years. Projects undertaken during these cruises include Operation SAMS: Sludge Acid Monitoring Survey (Ocean Disposal in the Mid-Atlantic Bight) and Operation MIDOS: Municipal and Industrial Dumping Oceanographic Survey in the New York Bight.

Dr. Champ has served as a consultant to the Corps of Engineers, the Environmental Protection Agency, the Department of State, and to several private organizations. Last year, he was one of two U.S. Delegates to the UNESCO—Man and the Biosphere Meeting (Aquatic Ecosystems) in Paris.

Dr. Champ has published numerous papers, reports and articles on various aspects of the aquatic environment. He is a member of The Society of Sigma Xi, Phi Kappa Phi, Phi Sigma Society, Beta Beta Beta, The American Fisheries Society, The American Society of Limnology and Oceanography, and the Atlantic Estuarine Research Society.

DEPARTMENT OF THE ARMY,  
BOARD OF ENGINEERS FOR RIVERS AND HARBORS,  
Fort Belvoir, Va., January 30, 1976.

HON. ROBERT BAUMAN,  
House of Representatives,  
Cannon House Office Building,  
Washington, D.C.

DEAR MR. BAUMAN: I am forwarding to you the attached for incorporation in the Hearing Record. I am sorry that I was unable to respond at the time in person.

I appreciated very much the opportunity to present my testimony before the joint hearing, and if I can be of further service please do not hesitate to call (202/325-7157).

Thank you.

Sincerely yours,

MICHAEL A. CHAMP, PH. D.,  
Resident Scholar.

Enclosure

DEAR CONGRESSMAN BAUMAN: I understand that Dr. Lloyd Falk of I. E. du Pont Company in his testimony on Friday, January 23, made an incorrect and misleading reference to some results of my research that I gave in my testimony.

He indicated that control fish and invertebrates in the "In situ Bioassay" cage tests died, as well as those which were placed in the sea water containing acid wastes which had recently been ocean dumped by du Pont. This is not true. The results of the experiments conducted in August 1974 were:

1. All fish that were exposed to acid wastes died, either in bioassay cages or in tanks. Invertebrates appeared to be the least impacted; only sand dollars were found discolored and/or dead.

2. The control tests for the "In situ" cages were damaged by being crushed by an unknown boat; they were squashed open with most organisms being released with a few fish still alive in one cage with several crushed to death. Thus the true controls experiment was invalidated. Due to the complication of explaining all the details of this particular experiment, I did not explain the loss of control fish; I just indicated that the results of the "in situ" cage bioassays were not complete, although all fish that were exposed to the acid waste died.

I did, however, go into the results of several shipboard tank bioassays, which were conducted at the same time, in which sea water containing recently ocean dumped acid wastes were pumped directly into large 200 gallon aquaria containing fish and invertebrates similar to those in the bioassay cages. In these experiments, all were dead within two hours, while the control tanks contained live samples at the end of 24-hour and 48-hour test periods. Contrary to du Pont's testimony, I consider this ample evidence of short-term damage.

I bring this to your attention because Dr. Falk's comment indicating that these were of little value is incorrect. The significance of these studies is: when fish were exposed to sea water containing acid wastes (pumped into test containers immediately after ocean barge disposal), even at the slower discharge rate of 3,000 gallons per minute, all fish died.

I would assume that normally, adult fish sense the acid waste danger and move quickly away from the area, while juvenile fish remain and may be killed if they are in the mixing zone behind the barge (in four hours this may be an area one mile wide by 8-10 miles long, depending on the barge dumping pattern.)

Thank you very much for allowing me to correct the record.

Sincerely,

MICHAEL A. CHAMP, PH.D.,  
*Vice President of Research, The Marine Science Consortium, and  
 Assistant Professor of Biology, the American University.*

STATEMENT OF FERENC K. SZUCS, CHAIRMAN,  
 BOARD OF DIRECTORS, LAKE ERIE MARINE SCIENCE CENTER

Mr. Chairman, members of the subcommittees, ladies and gentlemen, my name is Ferenc K. Szucs, and I live in New Castle, Pennsylvania. I am a certified member of the American Association of Geological Scientists, and a charter member of the International Association of Geochemistry and Cosmochemistry. Currently, I hold a post as a Professor of Geochemistry and Mineralogy at State College, Slippery Rock, Pennsylvania, and am Chairman of the Board of Directors of the Lake Erie Marine Science Center, operated by the Marine Science Consortium (a corporation of nineteen colleges and universities from the Eastern United States), Gannon College and the Martin Luther King Center in Erie, Pennsylvania. Since 1968, I have participated in several pollution research cruises in the Atlantic Ocean and the Great Lakes, and carried out research activities in environmental biogeochemistry within the framework of the Marine Science Consortium.

The Marine Protection, Research, and Sanctuaries Act of 1972 resulted from public recognition of the degrading conditions of our marine environments by anthropogenic means. The notion of human attitude toward commons is not new. Already Aristotle observed: "For that which is common to the greatest number, has the least care bestowed upon it." Now, the problem we are faced with is the ways to manage such public domains. At the time when P.L. 92-532 was enacted, the responsibilities for carrying out the purposes of the Act were invested in four agencies: the Environmental Protection Agency and the Army Corps of Engineers to regulate through permits and eventually eliminate ocean dumping of waste and dredged materials (Title I.); the U.S. Coast Guard to survey dumping activities (Title I.); and the National Oceanic and Atmospheric Administration to perform basic research (Title II.), and to establish marine sanctuaries (Title III.). Sufficient time has now elapsed, since the enactment of P.L. 92-532, to allow an evaluation of the functioning of the above infrastructure.

Presently, there are eleven ocean dumpsites in the Atlantic and the Gulf of Mexico. One important task in assessing the present conditions of the marine environment, is to conduct baseline surveys around these sites. To date, EPA and NOAA have completed only two such baseline studies (the New York Bight and the Philadelphia-Du Pont dumpsites). These surveys are designated to provide scientific data for environmental impact statements. There are two ways to establish the background level, i.e. the concentration of selected chemical elements prior to man's interference with the area: spatial and temporal. The spatial approach assumes that at a given distance from a dumpsite one would find the background level. This method is questionable in many cases, because it is not known how large an area has been anthropogenically impaired through the aid of dispersing agents of the ocean. This mode of inquiry of surface sediment and water column analysis was employed during the two baseline studies completed. The temporal method utilizes vertical information obtained from cores to assess the changes of a given metal concentration back in time.

The purposes of the New York Bight study were to "determine the fate and effect of pollutants", and to recommend alternative sewage dump sites. Although, NOAA has conducted limited research on the effects of ocean dumping outside the New York Bight, their reports show good planning and execution of scientific tasks. Their conclusion in the March, 1975 report (ERL 321-MESA 2) is as follows: "Although impacts of these wastes on the marine en-

vironment are not clearly understood, there is evidence that the water, bottom sediments, and living resources are under stress." "Available evidence does not indicate any environmental advantages which might result from moving the (present) sludge site. Temporary utilization of a new site is likely to result in more harm than good." It is unfortunate that, in spite of NOAA's conclusion, EPA Region II has decided, for no particular reason, to move the present sewage dumping operation to a new disposal site farther seaward, on an interim basis, effective 1 July 1976.

The baseline survey around the Philadelphia-Du Pont dumpsites was undertaken by personnel of EPA Region III. They have amassed considerable data on these sites during four cruises between May 1973 and August 1974, but the samples collected were not scientifically selected, and the data analysis is not statistically sound. While it is desirable to find alternate, less harmful ways to disposal of waste in the ocean, it is regrettable that EPA did not establish, at least in this case, adequate criteria for determining the environmental effects of the dumped materials.

Surveillance of dumping activities is assigned by the MPRSA to the Coast Guard. According to the data available, less than ten percent surveillance missions were performed by the Coast Guard of all scheduled dumpings. Our experiences in both the New York Bight and off Delaware Bay indicate that violations to dumping regulations are quite frequent, and a better deterrent system should be established either through increased fines or more common surveillance.

The Corps of Engineers has the basic responsibility for regulating ocean dumping of dredged materials. Currently, dredged materials represent eighty-ninety percent of the total weight of waste disposed in the oceans and the Great Lakes. Most of this comes from maintenance of existing harbors or development of new harbors. In the Great Lakes basin alone, there are 115 navigation projects maintained by the COE. While dumping dredged materials from harbors to deeper water does not add pollutants to the total water system, it is important in its possible effects on plankton and benthic community associations. To reduce the impact of dredged materials on open water, with the passage of the Rivers and Harbors Act of 1970 (P.L. 91-611), the COE has undertaken the construction of retaining dikes in several areas along the Great Lakes. In addition, the Corps is responsible, under P.L. 92-532, of a five-year Dredged Material Research Program funded by a total budget of \$30 million. One of the four designated field test sites is located in Lake Erie off the Ashtabula Harbor.

The total performance of the infrastructure under discussion is controlled significantly by the different avenues through which the four agencies responsible for the implementation of the MPRSA must obtain their budget. While EPA receives annual funds directly, the COE builds its request into the budget of the Department of the Army, the Coast Guard operates under the jurisdiction of the Department of Transportation, and NOAA's budget must be first approved by the Department of Commerce, prior to submission to the Office of Management and Budget. These diverse fiscal channels result in isolated fundings which appear disproportionate when viewed in light of the various functions. The budget received for various purposes is not based on priorities, but depends solely on the ability of the respective agency to secure funds through their department and the OMB.

Based on the above observations regarding the functioning and performance of the four agencies involved in carrying out the purposes of MPRSA, the following recommendations are made:

(1) In order to utilize more effectively available funds and other economic resources, there is a need for greater coordination of activities under the aegis of the Marine Protection, Research, and Sanctuaries Act. This coordination must be accomplished at both the national and regional levels. It would be preferable to identify one federal agency to carry out the goals of P.L. 92-532. This agency should be provided with both sufficient funds and authorities. If this is not possible, a greater degree of coordination should be exercised among the existing federal agencies. Cooperation with state agencies and local organizations should be extended.

(2) For a complete understanding of the complex marine environment, we must use systems analysis. Doxiadis, the great Greek planner, noted: "We continue to be sidetracked into concentrating upon symptoms, missing the total

picture . . ." Ocean dumping, because of its high visibility, receives attention from both federal and state agencies and the public. It is easily overlooked that, for instance, in the New York Bight the barged sewage sludge makes up only 6-9% of the total concentration of contaminants reaching the ocean. The rest comes through runoff from land, municipal and industrial direct discharges of waste, mostly via the Hudson River, and atmospheric fallout. This large portion of total contaminants reaching all U.S. coastal waters should receive proportionate attention for research and regulation. In general, natural background, natural pollution, and the various sources of anthropogenic pollution must be simultaneously evaluated.

Thank you for your attention. I appreciate the opportunity to express my views on this subject. The opinion expressed in this testimony does not necessarily reflect the official position or policy of the organizations with which I am associated.

Mr. LEGGETT. Again the committee thanks you very much.

We will, at this time, recess now until 2 this afternoon.

[Whereupon, at 12:22 p.m., the subcommittee recessed, to reconvene at 2 p.m., the same date.]

#### AFTERNOON SESSION

Mr. SARBANES [presiding]. The subcommittee will come to order. We will resume the oversight and authorization hearings on the Marine Protection, Research, and Sanctuaries Act of 1972, which commenced this morning.

The first witness this afternoon will be Mr. Warren K. Rich, assistant attorney general and counsel to the secretary, Maryland Department of Natural Resources.

Warren, if you will come forward and take a seat, and anyone who is accompanying you, we will be happy to hear your statement.

Let me just say to the members of the subcommittee before Assistant Attorney General Rich commences, that I know from my own personal experience of the strong interest which he has taken in the application of this legislation, and of his own deep involvement in trying to apply standards with respect to matters that have impacted upon Maryland, and some of the surrounding States.

Mr. Rich has been a leader in helping to develop the law, and we are very pleased to have him here this afternoon to present his testimony.

#### **STATEMENT OF WARREN K. RICH, ESQ., ASSISTANT ATTORNEY GENERAL AND COUNSEL TO THE SECRETARY, MARYLAND DEPARTMENT OF NATURAL RESOURCES; ACCOMPANIED BY JOHN M. RADEMACHER, AN EMPLOYEE OF THE ENVIRONMENTAL PROTECTION AGENCY AND THE STATE OF MARYLAND**

Mr. RICH. Thank you very much.

With me is John M. Rademacher, who is an employee of both the Environmental Protection Agency and the State of Maryland.

Mr. Rademacher is acting in a joint capacity, and I do not know if he is in any jeopardy or not sitting at my right hand, but he can add whatever can be added.

Mr. SARBANES. At least while he is here we can offer him some protection, and afterwards, as he leaves the premises, as well.

Mr. LEGGETT [presiding]. I am sorry to have been delayed, gentlemen.

Mr. RICH. Mr. Chairman, we are appearing here today to attempt to inform this subcommittee of the ramifications of the actions of the Environmental Protection Agency as they pertain to the State of Maryland.

For the past 3 years, Maryland has fought the continued practice by the Environmental Protection Agency Region III of granting interim permits to various dischargers to discharge at a dump site 35 miles east of Ocean City, Md.

The Ocean Dumping Act, title 33, United States Code, section 1401, et seq., requires that the Administrator of EPA make a determination that proposed ocean dumping "will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities."

To a certain degree, Mr. Train has echoed this statutory language in refusing, on October 3, 1974, to issue a permit to allow Du Pont's dumping of waste offshore in the Gulf of Mexico. At that time he stated that, "it is the Administrator's responsibility to determine that dumping will not result in unreasonable environmental degradation."

This past September, in authorizing Philadelphia to dump offshore from Maryland after the so-called quasi adjudicatory hearing of May 1975, he interpreted the Ocean Dumping Act as follows:

Congress affirmatively prohibited the transport of materials for the purpose of ocean dumping, allowing the Administrator of EPA to modify that prohibition only in situations where he determines that dumping will not cause adverse effects to the marine environment or that the alternatives for disposal present a greater threat of harm to the public health and/or the environment.

These are great words, but the truth is that upon a region-to-region basis, ocean dumping is permitted according to the policies and practices of each EPA region. The lethal and sublethal effects of the continued dumping in the ocean bight areas offshore Long Island have been well documented by the Federal Government. Researchers are not just talking about adverse effects. The area has been rendered dead.

I want to call to your attention remarks of Gerald M. Hansler, regional administrator of region II. He said on February 22, 1972, and he is in the region where the New York Bight is located:

The President's ocean dumping bill recognizes that limited dumping of deleterious material might be necessary and that dumping of nondeleterious materials can be tolerated with regulation.

Highly treated and detoxified municipal sludge, if properly placed at sea, might not be objectionable.

Now, Mr. Hansler said that a couple of years ago, and more recently he said, in the December 1975 issue of "Pollution Engineering":

We all agree that ocean dumping is not a sound environmental practice, causing a dead sea for marine life around the sludge beds in the Bight.

However, the sludge beds are not creeping toward the shoreline as some have claimed.

We do intend to move the site to another temporary area farther out to sea, as the amount of sludge produced in region II increases with the use of advanced waste treatment.

On the one hand, everybody says it is a horrible situation, and on the other hand says all right, this area is bad enough, let us proceed to make another area bad.

We are seeking to avoid this situation offshore Maryland, but because of the various pressures asserted by Philadelphia, dumping continues. We think it is important to emphasize what the practice has been under the Ocean Dumping Act, for that act has not accomplished anything in the offshore Maryland area. Dumping had been authorized before this law by the Federal Government in an area offshore from Delaware, and now it has been transferred off the coast of Maryland.

The volume has increased. Before the EPA designated the present site for Philadelphia, Camden, and formerly DuPont, it did nothing. There were no baseline studies, no assessment of the environmental effects, let alone a complete environmental impact statement.

The Environmental Protection Agency merely designated as a new dump site an area off the coast of Maryland formerly used by the Department of the Army. It is designated to take care of industrial salt wastes because that had been the former designation by the Department of the Army.

We have learned that the people in the Department of the Army designated that site pretty much at random. This is a fact, and this is in EPA's 1975 report on ocean dumping, the fact that EPA did no study, and used the prior designation.

In authorizing dumping by the city of Camden, for instance, the EPA is prolonging the nontreatment of sewage waste by the Camden facility. That facility was built in 1955. In 1965 it had some problem with its vacuum filters, which are the mechanisms used to absorb liquid from the sludge. The operator of that plant quite frankly stated it was cheaper to go to ocean dumping rather than to fix the facility. And, since 1965 Camden has closed down even more of the facility, giving almost no treatment to its sewage. The city now dumps the very liquid-like sludge into barges and thence into the ocean.

There are no pretenses in the Camden situation—the sludge is raw; it contains bacteria and viruses. It is only 3 percent to 5 percent solid because of the lack of almost any treatment. The failure of the EPA to attain the rehabilitation of that facility all these years not only increased the hazard attributable to the raw sludge, but also allowed the facility to continuously discharge wastes into the Delaware River in violation of the law.

It should be recognized that proper sludge management goes hand-in-hand with proper waste treatment under the 1972 amendments to the Water Pollution Control Act.

If Camden were properly treating its sewage and digesting its sludge, the sludge would be much more amenable to an alternative, land-based disposition. By not giving proper treatment to the sludge, and by not requiring pretreatment by municipal and industrial contributors to the sewage treatment facility, Camden produces sludge which is most difficult to handle.

It is ironic that the worse the operation of the sewage treatment facility, the better the position of the municipality to claim

that alternative uses and disposition of the sludge are not available.

We do not want to dwell merely on the Camden situation, for the Philadelphia situation has many of the same issues. There is no pretreatment ordinance; there is minimal control on contributors to the system.

The major similarity is the unwillingness of both cities to get off the stick and do something about taking care of their sludge in an environmentally acceptable and useful manner. There is no mystery about utilizing sludge on land. A goal which must be achieved is to recycle the sludge as a resource which can add nutrients to the earth.

Sludge can be utilized in parklands, on highways, on spoil piles, and on abandoned and unabandoned strip mines. Sludge is being used by the State of Delaware on its highways and along the Chesapeake and Delaware Canal to revegetate the spoil extracted from the deepening of the canal.

Just a little more than a year ago, the District Court of the District of Columbia required that Maryland dispose of the raw sludge being generated by the Blue sewage treatment facility. Needless to say, not all the parties to that litigation were agreeable to placing that sludge on Maryland land, but within a matter of months, land was acquired, equipment leased and purchased, and more than 200 tons of raw sludge per day was being trenched without any runoff or contamination problems on lands located within Prince Georges and Montgomery Counties. In addition, Maryland is composting sludge, aiming for recycling to enrich agricultural soils.

All these activities came out of a willingness by Maryland to dispose of and utilize sludge in a manner which would not harm the environment. Not for one second during the Blue Plains negotiations was serious consideration given to ocean dumping. It just was not acceptable.

This litany is an attempt to indicate to this honorable subcommittee that sludge does not have to be dumped in the ocean.

However, in order to compel the localities to overcome their reticence and to utilize sludge on the land, the Federal Government must take strong affirmative action.

In addition, the ocean dumping permits issued by the EPA are a sham over and above the illegal designation of the sites. Records produced in the Philadelphia proceeding indicate that there has been and will be in the future short dumping of sludge enroute to the site.

The Food and Drug Administration, when notified of dumping near shellfish areas which lie enroute to the dump sites, must close down those areas to harvesting.

Dumping is not monitored. The Coast Guard has stated that it does not have sufficient men or equipment. We believe that not one act of dumping has ever been witnessed by EPA officials. There is no monitoring required for bacteria or viruses, even though the EPA's records indicate that a polio virus has been recognized within the dump site.

I want to emphasize a little history of Camden. The proper treatment of sludge, and the proper treatment of sewage go hand-in-hand. That facility was built in 1955. In 1965, it had some problem



with the vacuum filters, the mechanisms used to absorb the liquid from the sludge.

The operator of the plant—rather than fix the facility—this is what he admits: it was cheaper to go to ocean dumping.

Since 1965, Camden has closed down even more of the facility, giving almost no treatment to its sewage.

It is like a pipe. The sewage comes into Camden, there is a little bulge in the pipe, and it goes out into the river. There are no pretenses in the Camden situation. It contains bacteria and viruses. It is only 3 to 5 percent solid because of the lack of treatment.

If Camden were properly treating that sewage, that sludge would be more amenable to alternative land-based fill. By not giving proper treatment to the sludge, and by not requiring pretreatment by municipal facilities, Camden produces sludge which is very difficult to handle.

We admit that. But it is ironic that the worse the operation of the sewage treatment plant, the better the position of the municipality to claim there are no alternative uses for the sludge, and disposition of sludge is not available.

In the last couple of days there have been newspaper discussions about a polio virus. I would like to give you a little history of the background of that virus.

EPA was preparing to go out on one of the survey cruises. Dr. Gerald Berg, back in the Cincinnati laboratory, who is the head virologist, asked for a couple of samples in order to take a look at the viruses. They had never done this before. So the guy who was going out on the boat took nine water samples, five sediment samples, and one clam sample. That was a very limited amount of water. One usually takes 50 to 100 gallons of water with each sample, when you are testing for a virus.

He took 1,400 milliliters, which I think is about a quart and a half. It was very limited testing for a virus, and lo and behold, back at the Cincinnati laboratory they declare there is, in fact, a polio virus in one of the water samples.

Now, EPA has tried to say, or infer, in this morning's newspaper that in fact it was a Salk vaccine virus.

We spoke to Dr. Berg today, who is the head virologist, and he said no, they do not know what kind of virus it is.

In the report prepared at the time of the testing, it does not indicate that the virus was an attenuated, or weakened, virus, which is the Salk type virus.

Mr. Chairman, I think people are overlooking the point. A virus is out there; it is alive; it is persisting in an ocean environment, and given the limited amount of testing that has occurred, there are most probably, and this is what the scientists indicated to me, other viruses alive, and thriving out there in the ocean environment.

It is further conceded by EPA that there are viruses, that various viruses come from sludge. They do not grow in the ocean by themselves. They come from sludge.

Well, with all this background you go to EPA, and you say all right, what are you doing to test for viruses now.

Nothing. They are actually cutting down on their cruises, from four a year, down to two. It is too economically difficult to keep up

the cruises, and file the reports, and it is too difficult in fact to test for viruses because of the huge amount of water you have to take in order to adequately test for them.

I would also like to note with regard to the virus, that it is in direct violation of their regulations. Their regulations say, and I do not want to quote the whole thing, but it says, "It is prohibited to dump any material which would extend the range of biological pests, viruses," et cetera. That is right in their regulations, and even though it is directly contrary to the regulations, this virus matter was just put off, no further testing, no statements, until we pointed it out, because of the suit we filed in Baltimore.

Although there are no baseline studies of this dump site to compare with, several preliminary reports based upon findings of the latest cruise on December 7 through 16, 1975, which sampled an area extending 10 miles south of the Philadelphia dumpsite, indicate that an identifiable "sludge blanket" 2 to 4 miles wide may have developed through these entire 10 miles.

You should note in addition that the September 1974 cruise report has not yet been completed by the EPA, and that there is an apparent hesitance on the part of the EPA to accomplish any further cruises and ocean monitoring.

We should close by emphasizing that we do not see the beneficial results in the passage of the 1972 Ocean Dumping Act based upon the following factors:

One: Dumping existed prior to the act, but has actually increased subsequent to its passage.

Two: There has been no real environmental assessment carried out prior to designation of any site.

Three: EPA has not adopted a uniform policy for all of its regions which would prohibit ocean dumping except under the most unusual yet highly investigated circumstances.

Four: Everyone, including Dr. Gilbert T. Rowe, a Woods Hole scientist and a witness *for Philadelphia* at the May, 1975 adjudicatory hearing, agrees that placing sludge in the ocean is not right and wastes a resource. Furthermore, there can be no monitoring or control in the ocean system.

We are told by various oceanographic experts that the Continental Shelf area lying between Long Island and Cape Hatteras has reached its assimilative capacity. This means it cannot be used as a sink for the garbage and wastes of those unwilling to achieve acceptable, alternative methods of disposal.

Thank you very much.

Mr. LEGGETT. Mr. Rich, thank you very much. Your analysis is very helpful.

Let me ask you this, do you classify as sludge all the fluid?

Mr. RICH. No; the sludge is the residual matter coming after the sewage has been properly treated. It is the residual.

Mr. LEGGETT. I see.

Mr. RICH. It is the solid.

Mr. LEGGETT. It is solid?

Mr. RICH. It is not all solid; it has liquid.

Mr. LEGGETT. Now, the Blue Plains case you described, what are

the limits of the district that apply in that case? You said it is part of Virginia—

Mr. RICH. Contributors to the Blue Plains case are residents of the northern Virginia area, Fairfax County, Montgomery County, Prince Georges County, Md., the District of Columbia, and Alexandria.

Mr. LEGGETT. And do all of these areas discharge into one collective system?

Mr. RICH. All discharge into Blue Plains, that was mandated I believe back in 1918 because they did not want to have any discharges below a certain point; they passed a Federal law, you are going to discharge here.

WSSC was formed in Maryland and that is basically in a nutshell, historically it has been going into Blue Plains.

Now, there has been a change in direction and people realize you have to have regional type of facilities to handle this waste and that is one of the reasons for Dickerson up in Montgomery County and also for other plants on the Virginia side.

Mr. LEGGETT. You indicated you participated in the lawsuit respecting cleaning up of Blue Plains.

Mr. RICH. Yes.

Mr. LEGGETT. How much did it cost to buy your way out after the suit was settled by decree or otherwise?

Mr. RICH. You are saying what is the cost involved?

Mr. LEGGETT. Yes.

Mr. RICH. I do not have the specific figures. I can make them available to the subcommittee.

I approve all contracts that go through the State, but I really have not computed all the entire cost.

Mr. LEGGETT. Was it land acquisition?

What do you do, truck it?

Mr. RICH. Yes; it is trucking the—

Mr. LEGGETT. 200 tons a day?

Mr. RICH. Yes; raw sludge—that was the initial amount that was taken care of after the Blue Plains case. But it is trucking, it is land acquisition, it is designing the way to trench sludge—the way where there will be limited runoff and monitoring.

One of the points I did not make, if I may, is that when you talk about monitoring, I wonder—I wonder why the taxpayers of this country have to pay for the monitoring and surveillance attributable to specific discharges or dumpers in the ocean.

I would think that as part of the cost of doing business by these dischargers certain costs should be allocated to them, they should pay for these cruises, and they should pay for adequate testing, done by us, the Federal Government, or other interested third parties.

Mr. LEGGETT. We discussed that this morning. We could levy a tax or charge for the privilege of dumping in the ocean, but of course that would raise the money, but what we inevitably want to do is relocate dumping.

Mr. RICH. The big point on the part of the ocean dumper, today it is cheaper, easier, and quicker. I think you need to charge these guys to ocean dump. Then it is not going to be that much cheaper.

If you are going to really have some controls on what is being discharged, it is going to cost them money. If you do not spend the money, you are not going to have any controls at all. Controls are limited anyway.

Mr. LEGGETT. Now, is there anybody who ocean dumps out of Baltimore?

Mr. RICH. No. Not to my knowledge.

Mr. LEGGETT. And there is a lot of processing and manufacturing going on there?

Mr. RICH. Yes. I would think we probably have more than Philadelphia.

Mr. LEGGETT. Now, let's see, you laid it on Maryland—no, New Jersey and Philadelphia, Pa. Let's let New Jersey speak for itself here.

Mr. Forsythe.

Mr. FORSYTHE. Let me make a statement; that is not in my district, it is all too close.

Mr. RICH, the chairman was just discussing this cost business and you said you could supply it for the record.

Mr. RICH. Absolutely.

Mr. FORSYTHE. Would you have records on that on the basis of costs per million gallons of sewage.

Mr. RICH. Yes, I have seen those as a matter of fact. We have computed that way and I have seen them, but I do not really recall specifically what they are.

Mr. FORSYTHE. I would appreciate it if that could be supplied.

Mr. RICH. We have that. Yes. I could not—as I recall, it is something like \$40 per unit—and I forget what the unit is [Laughter].

Mr. RICH. I do not know whether it is a ton or hundred tons or something of that nature.

[The following was submitted:]

ECONOMICS OF LAND CONTAINMENT OF RAW SEWAGE SLUDGE FROM THE BLUE PLAINS TREATMENT PLANT

Data from the M-4 Land Containment Site in Montgomery County, Maryland demonstrates the costs involved in the trenching of partially de-watered raw sludge from the District of Columbia's Blue Plains Wastewater Treatment Plant.

The following is the total cost to date of land containing raw sludge at the M-4 Site. This Site is located 54 miles from the source of sludge at the Blue Plains Plant.

Site preparation.....	\$340,600. 00
Site operation.....	1,195,540. 00
Monitoring.....	3,860. 00

Total.....	1,541,000. 00
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Based upon 38,175 tons contained at M-4, this yields a cost of \$40.37 per ton of raw filter cake sludge, approximately 20% solids, or approximately \$202/ton of dry solids.

It should be noted that some of the above costs represent investment in equipment which will be used at additional sites in the future. Also, haulage costs to sites in Prince Georges County, closer to Blue Plains, will be less. Thus the overall cost/ton of trenching Blue Plains sludge should eventually average out somewhat lower than the above stated \$40.37/ton.

Source: The Maryland Environmental Service, Maryland Department of Natural Resources, 60 West Street, Annapolis, Md. 21401.

Mr. FORSYTHE. I would hope it could get back to that million dollars per million gallons of input. The fact that ocean dumping is cheaper is one of the factors that makes it much tougher to get utilization of alternatives.

Mr. RICH. It is a very easy type of situation. I mean, we should have said that down in Blue Plains. Let's just barge it down the Potomac River. It is the easiest way to do business.

Mr. FORSYTHE. I really thank you for your statement. I am very much aware of your problem.

Now, how we are going to get to that point in time when we can really cut it off.

Fortunately, I am not in the Newark metropolitan area either, where I think the problem is far worse and where far less has been done.

I will tell you the Camden county authority has just taken over the Camden city plant within the last few weeks, and hopefully they can now begin to improve matters.

Thank you, Mr. Chairman.

Mr. LEGGETT. Thank you, Mr. Forsythe.

Mr. Sarbanes.

Mr. SARBANES. You have been through these EPA hearings. I take it there it there is no technical reason why EPA could not give both Camden and Philadelphia a very short period of time to develop an alternative method of disposal, is there?

Mr. RICH. The alternatives are there. I mean there is no new technology involved in this. I mean, there are these somewhat unique type of technologies that are now evolving, but there are certain land based alternatives presently available and technology is there.

The big point made at the hearing by Mr. Guarino is that there were political problems—this is all in the record—there are political problems involved with placing sludge inland, in people's backyards. And because they had to educate the public, which is going to take an awful lot of time and money; that was the basic reason for not doing it faster.

Technology is there. I think the basic reason espoused was one of a political nature.

My point is we had to go in court against Prince Georges County, to place sludge in Andrews Air Force Base in Prince Georges County. Of course, the political problem is there. In fact, I could generate far greater problems in Prince Georges County and so could anybody if they know the right people and who to contact.

They could be self-generating. You have to go about it the right way.

But the point is the Federal Government has to take an affirmative position, say all right, there are alternatives on land now. You could take—we are going to accelerate your schedule, you are going to phase out ocean dumping within 1 year, within 2 years, and you can do that in a very safe way.

Mr. SARBANES. Suppose you took that position, how much time would you have to give Philadelphia and Camden to shift over? What would be reasonable, 6 months or year?

Mr. RICH. I believe a responsible official would say—I do not know if I am responsible—a responsible official would say that Cam-

den only has 15 million gallons of sludge. It is a minimal area. They can do it within a matter of even acknowledging their problems, they could do it safely, efficiently, within a matter of 90 days.

Philadelphia has a much larger amount of sludge, but it is better sludge in that it has been digested, it does not have as much liquid. Based upon our experience at Blue Plains, I can assure this committee that they can do it within 1½ years.

We did it well short of a year and we started doing it very soon, but we were up to snuff I think in less than a year.

Mr. SARBANES. Thank you.

Mr. LEGGETT. Thank you, Mr. Sarbanes.

Mr. Bauman.

Mr. BAUMAN. In the research you have done in the preparation of Maryland's case, have you found any technical proof that shows health hazard now exists in any human beings in the area, in the shore areas?

Mr. RICH. We think that it is an obvious health hazard, because if—let me give you an example. There was a closer dumping site, 12 miles off the coast of Delaware. Of course, that site had to be closed down for shellfish harvesting, and FDA found—this will come out in testimony next week before this committee—found when they sampled the sediment, that you were talking about a half million coliform in the sediment and 200,000 to 300,000 fecal coliform in that sediment.

That was found with the same type of waste offshore Delaware.

Now, if that is not a health hazard where you get those kinds of numbers of fecal coliform, I do not know what is a health hazard.

Mr. BAUMAN. Ocean bottom?

Mr. RICH. Ocean bottom, offshore Delaware.

I do not want to get too involved there, but we talked to this head guy, Gerald Berg, EPA Lab in Cincinnati. He says—and I think maybe we ought to make this a matter of record, I will be glad to put this in the record—it says—

Mr. LEGGETT. How many pages is it?

Mr. RICH. Well, it is a lot of pages.

Mr. LEGGETT. Why do you not give it to counsel to abstract it.

Mr. RICH. All right.

[The document follows:]

[From: Everyone Can't Live Upstream: Water Quality Problems on the Missouri River, (EPA, April 1971)]

#### THE VIRUS HAZARD ON THE MISSOURI RIVER

(By Gerald Berg, Daniel R. Dehling, Donald Berman, and Carl Walter)

A single infectious virus excreted by a human is capable of infecting other humans who consume that virus (Table 1) (1). The presence of a single such virus in water that people consume, therefore, constitutes a clearcut hazard to health and well-being.

Fecal coliforms always occur in the gastrointestinal tracts of warm blooded animals. Certain viruses and pathogenic bacteria may or may not be present at the same time. Fecal coliforms serve as indicators that viruses or pathogenic bacteria may be present. Thus, evidence of fecal coliforms in water is only an indication that hazardous agents may be present. Evidence constituted by many other biological and chemical indicators of pollution is often equivocal too, because in themselves, these indicators usually cannot be shown to be injurious

to health. When no one line of evidence is conclusive, multiple lines of such evidence must be relied upon to support enforcement actions on the premise that the sum of the many such lines of evidence will stand stronger than any one line could stand alone.

Viruses are a different matter. Each virus is capable of producing infection. Each virus is thereby a dangerous pollutant. Thus, the detection of a single virus particle is the detection of a dangerous pollutant.

The detection of a virus in a sewage effluent ejected into a waterway constitutes a clear and present danger to health in the area of the outfall, immediately downstream of the outfall, and in communities well downstream when that virus will survive in the stream long enough to reach the downstream communities. Even when downstream transmission is not in evidence, the presence of viruses in an effluent and in a receiving water a short distance downstream of the outfall from which the effluent is discharged is a hazard, constitutes an adulteration of stream quality in that area, and thereby in itself demands remedial action.

#### MATERIALS AND METHODS

*Collection of samples.*—All samples were collected by Region personnel. Raw influent and effluent samples were collected in cubitainers from primary treatment plants along the Missouri River and couriered to Cincinnati by air or transported by truck when river water samples were also taken. Samples were kept cold during transport.

Most sewage and effluent samples were processed immediately upon reaching the laboratory, but some were stored at  $-70^{\circ}\text{C}$  before processing.

Large samples of water were collected in 55-gallon plastic-lined drums from selected locations on the Missouri River and trucked overnight to Cincinnati. In some instances, field filtrations were achieved with the equipment described below and the filter sandwiches were returned to Cincinnati, along with the silt collected on the pre-filters, for processing.

*Recovery of viruses from sewage and treatment plant effluents.*—Each two-liter sample of sewage or treatment plant effluent was filtered through a Millipore AP 20 fiberglass prefilter and an MF 0.45  $\mu$  membrane filter. Prefilters and filters were pretreated with 0.1% Tween-80 to prevent virus adsorption to the filters and then rinsed with distilled water prior to contact with the samples. Ten ml of an  $\text{Al}(\text{OH})_3$  gel, prepared in McIlvaine's buffer<sup>1</sup> by procedures described elsewhere (2), was added to each filtered sample and each suspension was stirred with a magnetic stirrer for an hour. The  $\text{Al}(\text{OH})_3$  precipitates, to which virus had adsorbed, were collected by filtration on MF 0.45  $\mu$  membranes and removed with a spatula. The membranes were washed with 10 ml of a cell growth medium, and the washings were added to the corresponding  $\text{Al}(\text{OH})_3$  precipitates. The suspensions of medium and  $\text{Al}(\text{OH})_3$  were diluted 1:5 and inoculated onto cell cultures, 1 ml per culture, for assay by the plaque technic.

Five grams of fraction 5 bovine albumin and 100 ml of 1% aqueous protamine sulfate were added to each sample from which the  $\text{Al}(\text{OH})_3$  had been filtered and the suspensions were stirred for 30 minutes with a magnetic stirrer. The precipitates that formed were then collected on Tween-80-treated Millipore AP 20 fiberglass prefilters, and 1 ml of 1 M NaCl was filtered through each pad to dissolve the precipitates and elute the viruses. Each pad was subsequently washed with 6 ml of distilled water which were added to the corresponding dissolved precipitate, and the total volumes were inoculated onto cell cultures, 1 ml per culture, for assay by the plaque technic (3).

In some tests, the  $\text{Al}(\text{OH})_3$  and protamine sulfate procedures were applied to separate samples of effluent, because at the time the studies were done, it was believed that the  $\text{Al}(\text{OH})_3$  procedure would recover only small viruses and the protamine sulfate procedure would recover only large viruses. Subsequently, it was shown that the  $\text{Al}(\text{OH})_3$  procedure does recover some large viruses, and the protamine sulfate procedure does recover some small viruses. Thus, the results from the  $\text{Al}(\text{OH})_3$  procedure and those from the protamine sulfate procedure overlap somewhat and are not additive when separate effluent samples were used for each. Unless otherwise indicated in the table footnote, however, the two procedures were applied in tandem on the same sample, and the total number of viruses recovered reflect the minimum present in the sample. In any

<sup>1</sup> McIlvaine's buffer consisted of 0.05 M  $\text{Na}_2\text{HPO}_4$  and sufficient citric acid to bring the pH to 6.

event, neither procedure is quantitative. The total amount of viruses in an effluent must exceed by some considerable amount the quantity of viruses detected.

*Recovery of viruses from river water.*—Fifty or 100 gallons of river water were filtered through a 293 mm Tween-80-treated Millipore AP 20 prefilter and then through two 143 mm Tween-80-treated AP 20 prefilters between which were sandwiched 1.8 gm of washed Monsanto PE 60 polyelectrolyte (4). The filter pads were supported in Millipore filter holders of appropriate size connected in tandem. The 293 mm filter clogged frequently with silt and was replaced as necessary. The silt was collected with a spatula and the virus eluted from it with 3% beef extract by a method designed in this laboratory (6). Viruses were eluted from the polyelectrolyte by circulating 60 ml of 0.5% pancreatin through the sandwich three times, and then circulating 60 ml of pH 9 borate buffer containing 10% fetal calf serum through the sandwich three times. The borate buffer consisted of 0.05 M  $\text{H}_2\text{BO}_3$ , 0.05 M KCl, and sufficient NaOH to bring the pH to 9. Each eluate was collected separately, filtered through an MF 0.45  $\mu$  membrane filter to remove bacteria and fungi, and inoculated onto cell cultures, 1 ml per culture for assay of viruses.

*Cell cultures.*—All viruses were isolated by the plaque technic in primary cell cultures prepared from rhesus monkey kidney cells.

*Identification of viruses.*—Viruses are being identified under contract with Dr. S. S. Kalter, Southwest Foundation for Research and Education, San Antonio, Texas.

#### RESULTS AND DISCUSSION

Our first important effort to demonstrate virus pollution of a major stream was undertaken in the late summer of 1969 along the Missouri River. Repeated efforts to demonstrate, with standard pollution indicators [such as depressed dissolved oxygen levels (DO) and 5-day 20 C biochemical oxygen demands (30D)] deleterious alteration of the stream by communities that discharged primary effluents into it had been essentially unsuccessful. The likelihood of recovering viruses from a stream when other indicators of pollution could not be demonstrated seemed remote: Viruses usually do not reach levels much beyond several thousand plaque-forming units (PFU)<sup>a</sup> per gallon of sewage, they do not multiply in the effluent or in the stream, and they slowly die off as time progresses. Moreover, once diluted in the stream they become difficult to detect because good quantitative concentration methods have not yet been developed. There did exist, however, the advantage that demonstration of even one virus particle of human origin is bonafide evidence of dangerous pollution, whereas small changes in pollution indicator values below outfalls are difficult to interpret.

Thus, our initial efforts were directed at detecting viruses in effluents discharged into the river. Six times during the months of September and October 1969, samples were taken from sewage treatment plants along stretches of the waterway. Most samples were primary effluent, but some raw sewage and river water samples were also taken. Viruses, often several hundred per gallon, were consistently recovered from municipal treatment plant primary effluents, and from raw sewage (Tables 2-7) Stock yard effluents also yielded hundreds of viruses when tested in calf kidney cells, indicative that animal viruses in large numbers are continuously discharged into the waterway. In itself, all of this was bonafide evidence that the Missouri River was being polluted with infectious agents.

To determine how far downstream these infectious agents constituted a hazard presented a more complex problem, because dilution of the viruses in the stream necessitates a concentration of small numbers of viruses from very large volumes of water. No established methods were available for such studies. As an alternative, viruses of the types present in sewage effluents (enteroviruses and reoviruses) were seeded into Missouri River water and into the effluents as well, and 24-hour viral survivals (long enough to reach major downstream water supplies) were determined. Table 8 shows that large numbers of viruses survived in the Missouri River water, in the sewage, and in the effluents after 24 hours. The reovirus, reportedly capable of producing cancers in certain animals when inoculated in very small amounts (5), appeared to increase in numbers in

<sup>a</sup> Plaque-forming units are infectious units.



the river water, perhaps the result of clumps breaking up. It was clear, in any event, that viruses ejected into waterways with domestic sewage could reach water intakes many miles downstream.

The detection of viruses at water intakes downstream of a pollution source can demonstrate that the hazard perpetrated in the area of an outfall by the discharge of viruses into that area has extended itself to the downstream community. Good quantitative technics for detecting small amounts of viruses in large volumes of water were not available, but a technic under development, capable of detecting a portion of the viruses present, gave some promise of sufficient sensitivity. This was the polyelectrolyte method. In this method (see Materials and Methods), large volumes of water are filtered through a Monsanto compound designated PE 60 which adsorbs some viruses. Adsorbed viruses subsequently can be eluted and quantified. Thus, an effort was made to recover viruses from large volumes of river water. An attempt was made also to recover viruses from the silt that collected on fiberglass prefilters used to remove suspended material before the water passed through the polyelectrolyte. A number of attempts were made to detect viruses upstream and downstream from outfalls and at some water intakes. These studies are summarized in Table 9.

A 50-gallon water sample taken at Missouri City yielded five viruses, and a sample of similar size taken at Bellevue yielded four viruses. Six more viruses were recovered from the silt in the water sample. At Sioux City, four viruses were recovered from a 50-gallon water sample and its silt five miles below the sewage outfalls, but none were recovered from samples taken above the outfalls. Forty-eight viruses per liter of sample were recovered from Sioux City primary effluent sampled on the same day.

A mid-winter study at St. Joseph yielded interesting results. One virus was recovered from 50 gallons of water taken at Palermo landing, about 10 miles below St. Joseph's sewage treatment outfalls, but 19 viruses were recovered from a sample of similar size taken at the water intake above the outfalls. This is equal to 360,000 viruses per million gallons of water. Recovery of viruses from water intakes during the winter, especially, when transmission of enteric viruses is at a relatively low point, underscores the hazard perpetrated upon downstream communities by upstream communities that discharge viruses in their effluents. St. Joseph primary effluents also yielded considerable quantities of viruses (Table 9). This study was repeated in the spring at which time viruses were again recovered from the water intake, and at Palermo landing also.

All viruses identified thus far are polioviruses and echoviruses, are of human origin, and are capable of infecting humans who consume them.

Since trucking multiple 50-gallon samples to Cincinnati, especially during the winter months, was difficult, a comparative study was set up at the time of the spring sampling at St. Joseph to determine whether filtrations through the polyelectrolyte could be done in the field and virus elution and isolation subsequent to return of the filters to the Cincinnati laboratory. The results of this study show that the same amount of viruses were recovered when filtrations were done in the field as when they were done in the laboratory on trucked-in samples (Table 10). Subsequent studies in our laboratory showed that storage of the filters at 4 C for several days before and after water was filtered through them did not reduce virus recoveries (Table 11), and thus added support to the feasibility of a field filtration technic. The results in Table 11 also demonstrate the inefficiency of the technic as a quantitative method for virus recovery.

Although technical problems occurred in the field that made it impossible to filter much more than half of the 50 gallons that were filtered in the laboratory, these problems were minor and should be easy to resolve.

#### SUMMARY

A single viable virus excreted by a human is capable of infecting other humans who consume it, and thus constitutes a hazard to health and well-being. Thus, each virus is a dangerous pollutant. Viruses have been detected along the Missouri River in effluents, midstream, and at water intakes, demonstrating a clearcut hazard perpetrated upon downstream communities by those upstream. The methods used to demonstrate the virus pollution were capable of detecting only a portion of the viruses present. Thus, many more viruses were present than we were able to detect. There is clearly an urgent need for developing better methodology for detecting small numbers of viruses in large volumes of water.

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TABLE 1.—MINIMAL INFECTIVE DOSE OF VIRUSES FOR MAN

Virus	Dose <sup>1</sup>	Route of inoculation	Number infected	
			Number inoculated	Percent infected
Poliovirus 1 (SM).....	2 PFU.....	Oral (gelatin capsule).....	2/3	67
Poliovirus 3 (Fox).....	1 TCD <sub>50</sub> .....	Gavage.....	3/10	30
Measles.....	do.....	Intranasal.....	8/35	24

<sup>1</sup> Given in plaque-forming units (PFU) or that amount of virus that will infect 50 pct. of the tissue cultures inoculated (TCD<sub>50</sub>).

TABLE 2.—RECOVERY OF VIRUSES FROM MISSOURI RIVER EFFLUENTS [SAMPLES OF SEPT. 19, 1969]

Sample	Site of sampling		Type of effluent	Laboratory recovery method	Virus recovered (PFU/liter)
	Place	River miles			
A-25.5.....	Atchison sewage treatment plant...	421.0	Primary.....	Al(OH) <sub>3</sub> .....	9.5
L-24.5.....	Leavenworth sewage treatment plant.	395.6	do.....	do.....	
SJ-15.....	St. Joseph sewage treatment plant.	446.4	do.....	do.....	8
SJ-18.....	South St. Joseph industrial sewage district (stock yard).	445.6	do.....	do <sup>1</sup> .....	2.5
				Protamine sulfate <sup>1</sup> ..	10
				Al(OH) <sub>3</sub> .....	0
				Protamine sulfate...	4

<sup>1</sup> Tested in calf kidney cells.

TABLE 3.—RECOVERY OF VIRUSES FROM MISSOURI RIVER EFFLUENTS

[Samples of Sept. 24, 1969]

Sample	Site of sampling		Type of effluent	Laboratory recovery method	Virus recovered (PFU/liter)
	Place	River miles			
A-25.5.....	Atchison sewage treatment plant..	421.0	Primary.....	Al(OH) <sub>3</sub> .....	128.5
				Protamine sulfate....	274
L-24.5.....	Leavenworth sewage treatment plant.	395.6	do.....	Al(OH) <sub>3</sub> .....	50
				Protamine sulfate...	9
SJ-15.....	St. Joseph sewage treatment plant.	446.4	do.....	Al(OH) <sub>3</sub> .....	53
				Protamine sulfate...	20.5
SJ-18.....	South St. Joseph industrial sewer district (stock yard).	445.6	do.....	Al(OH) <sub>3</sub> <sup>1</sup> .....	45.5
				Protamine sulfate...	58
				Al(OH) <sub>3</sub> .....	85
				Protamine sulfate...	15

<sup>1</sup> Tested in calf kidney cells.

TABLE 4.—RECOVERY OF VIRUSES FROM MISSOURI RIVER EFFLUENTS

[Samples of Sept. 26, 1969]

Sample	Site of sampling		Type of effluent	Laboratory recovery method	Virus recovered (PFU/liter)
	Place	River miles			
M-19.....	Big Blue River sewage treatment plant.		Primary.....	Al(OH) <sub>3</sub> .....	96
				Protamine sulfate...	18
M-104.....	Kansas City, Mo., westside sewage treatment plant.	367. 19	do.....	Al(OH) <sub>3</sub> .....	71
				Protamine sulfate...	0
M-106.....	Rock Creek below North Kansas City sewage treatment plant.	362. 7	do.....	Al(OH) <sub>3</sub> .....	2.5
				Protamine sulfate...	0.5
M-108.....	Rock Creek at Independence, Mo., raw sewage by-pass line.	356. 9	Raw sewage..	Al(OH) <sub>3</sub> .....	85.5
				Protamine sulfate...	9
M-102.....	Kaw Valley District outfall.....	367. 6L	Primary.....	Al(OH) <sub>3</sub> .....	61
				Protamine sulfate...	2
M-103.....	Kansas City, Kans., sewage treatment plant.	367. 2L	do.....	Al(OH) <sub>3</sub> .....	73
				Protamine sulfate...	2.5

<sup>10</sup> Separate samples used for tests with Al(OH)<sub>3</sub> and protamine sulfate.

TABLE 5.—RECOVERY OF VIRUSES FROM MISSOURI RIVER EFFLUENTS

[Samples of Oct. 1, 1969]

Sample	Site of sampling		Type of effluent	Laboratory recovery method	Virus recovered (PFU/liter)
	Place	River miles			
M-19.....	Big Blue River sewage treatment plant.		Primary.....	Al(OH) <sub>3</sub> .....	109
				Protamine sulfate...	0
M-102.....	Kaw Valley District outfall.....	367. 6L	do.....	Al(OH) <sub>3</sub> .....	0
				Protamine sulfate...	1
M-103.....	Kansas City, Kans., sewage treatment plant.	367. 2L	do.....	Al(OH) <sub>3</sub> .....	146
				Protamine sulfate...	56
M-104.....	Kansas City, Mo., westside sewage treatment plant.	367. 19	do.....	Al(OH) <sub>3</sub> .....	92
				Protamine sulfate...	6
M-106.....	Rock Creek below north Kansas City sewage treatment plant.	362. 7	do.....	Al(OH) <sub>3</sub> .....	1.5
				Protamine sulfate...	0
M-108.....	Rock Creek at Independence, Mo., raw sewage by-pass line.	356. 9	Raw sewage..	Al(OH) <sub>3</sub> .....	16
				Protamine sulfate...	0.5

TABLE 6.—RECOVERY OF VIRUSES FROM MISSOURI RIVER EFFLUENTS

[Samples of Oct. 16, 1969]

Sample	Site of sampling		Type of effluent	Laboratory recovery method <sup>1</sup>	Virus recovered (PFU/liter)
	Place	River miles			
OM-40A.....	Omaha-Missouri River sewage treatment plant from Monroe Street bypass.	611. 5	Raw sewage..	Al(OH) <sub>3</sub> .....	19
				Protamine sulfate...	222
M-211.....	Pacific Fruit Express outfall.....	611. 5R	Train car wash raw discharge.	Al(OH) <sub>3</sub> .....	0
				Protamine sulfate...	0
M-212.....	Quaker Oats Co.....	615. 2L	Raw process waste outfall.	Al(OH) <sub>3</sub> .....	0
				Protamine sulfate...	0

<sup>1</sup> Separate samples used for tests with Al(OH)<sub>3</sub> and protamine sulfate.

TABLE 7.—RECOVERY OF VIRUSES FROM MISSOURI RIVER EFFLUENTS  
[SAMPLES OF OCT. 24, 1969]

Sample	Site of sampling		Type of effluent	Laboratory recovery method	Virus recovered (PFU/liter)
	Place	River miles			
M-38.....	Bellevue, 0.1 mile above State Highway 370 bridge.		River water.	Al(OH) <sub>3</sub> <sup>1</sup> .....	0
				Protamine sulfate <sup>1</sup> .....	0
M-203.....	Omaha-Papillion Creek sewage treatment plant.		2/3 secondary.	Al(OH) <sub>3</sub> <sup>1</sup> .....	41
			1/3 primary.	Protamine sulfate <sup>1</sup> .....	1.5
M-211.....	Pacific Fruit Express.....	611.5R	Train car wash raw discharge.	Al(OH) <sub>3</sub> <sup>1</sup> .....	0
				Protamine sulfate <sup>1</sup> .....	0
M-212.....	Quaker Oats Co.....	615.2L	Raw process waste outfall.	Al(OH) <sub>3</sub> <sup>1</sup> .....	0
				Protamine sulfate <sup>1</sup> .....	0
OM-40A.....	Omaha-Missouri River sewage treatment plant.	611.5L	Primary.....	Al(OH) <sub>3</sub> <sup>1</sup> .....	20
				Protamine sulfate <sup>1</sup> .....	26
TC-210.....	Twin Cities Plaza raw sewage discharge.	613.6R	Raw sewage..	Al(OH) <sub>3</sub> <sup>1</sup> .....	5
				Protamine sulfate <sup>1</sup> .....	7
CB-40B.....	Council Bluffs sewage treatment plant.	614.0R	Primary.....	Al(OH) <sub>3</sub> <sup>1</sup> .....	135
				Protamine sulfate <sup>1</sup> .....	286
OM-208.....	Monroe Street bypass of raw wastes to Missouri River.	611.4L	Raw packing Waste.	Al(OH) <sub>3</sub> <sup>1</sup> .....	95
				Protamine sulfate <sup>1</sup> .....	201
				Al(OH) <sub>3</sub> <sup>2</sup> .....	0
				Protamine sulfate <sup>2</sup> .....	.5

<sup>1</sup> Separate samples used for tests with Al(OH)<sub>3</sub> and protamine sulfate.

<sup>2</sup> Tested in calf kidney cells.

TABLE 8.—SURVIVAL OF VIRUSES IN MISSOURI RIVER WATER AND IN SEWAGE EFFLUENTS<sup>1</sup>

Date samples were collected	Site of sampling			Poliovirus 1—hours		Echovirus 7—hours		Reovirus 1—hours	
	Place	River miles	Type of sample	0	24	0	24	0	24
Oct. 7, 1969	River water	354.4	Water	$9.6 \times 10^{+2}$	$7.1 \times 10^{+4}(74)^3$	$9.5 \times 10^4$	$4.7 \times 10^{+5}(50)$	$1.6 \times 10^3$	$1.07 \times 10^{+4}(167)$
	Big Blue River sewage treatment plant		Primary effluent	$11.3 \times 10^4$	$6.0 \times 10^{+5}(53)$	$8.8 \times 10^4$	$13.2 \times 10^{+5}(150)$	$2.4 \times 10^3$	$2.06 \times 10^{+4}(86)$
Oct. 29, 1969	River water	601.3	Water	$1.1 \times 10^5$	$6.8 \times 10^{+6}(61)$	$8.7 \times 10^4$	$8.0 \times 10^{+6}(92)$	$1.21 \times 10^3$	$1.65 \times 10^{+4}(136)$
	Papillion Creek	596.6	2/3 secondary	$1.12 \times 10^5$	$4.4 \times 10^{+6}(40)$	$7.6 \times 10^4$	$1.04 \times 10^{+6}(136)$	$9.4 \times 10^3$	$2.23 \times 10^{+4}(238)$
			1/3 primary						
Nov. 9, 1969	River water	440.3	Water	$1.47 \times 10^4$	$3.2 \times 10^{+6}(22)$	$1.44 \times 10^5$	$7.8 \times 10^{+6}(54)$	$3.2 \times 10^3$	$2.15 \times 10^{+4}(672)$
	S. St. Joseph Ind. sewer district	445.6	Primary effluent	$1.34 \times 10^4$	$1.22 \times 10^{+6}(91)$	$1.2 \times 10^5$	$9.5 \times 10^{+6}(79)$	$5.2 \times 10^3$	$3.39 \times 10^{+4}(65)$
Nov. 17, 1969	River water M-48	718.3	Water	$3.12 \times 10^4$	$5.8 \times 10^{+6}(19)$	$1.6 \times 10^4$	$5.6 \times 10^{+6}(35)$	$1.25 \times 10^4$	$5.1 \times 10^{+4}(408)$
	Sioux City SC-49	729.0R	Primary effluent	$1.89 \times 10^4$	$8.4 \times 10^{+6}(44)$	$1.34 \times 10^4$	$6.8 \times 10^{+6}(51)$	$1.4 \times 10^4$	$1.52 \times 10^{+4}(109)$

<sup>1</sup> Samples were stored at room temperature (23–26 C).<sup>2</sup> PFU per ml.<sup>3</sup> Percent surviving given in parenthesis.

TABLE 9.—RECOVERY OF VIRUSES FROM MISSOURI WATER AND SILT

Date of sampling	Site of sampling		Type of sample	Size of sample	Lab recovery procedure	Virus recovered (IFU/sample)	Virus types recovered <sup>1</sup>
	Place	River miles					
Oct. 8, 1969.....	Missouri City powerplant dock.....	354. 4	Water.....	50 gal.....	Polyelectrolyte.....	5	E8, E8, E1, E1, E7.
			Silt.....	From 8.33 gal. <sup>2</sup> .....	Beef extract.....	0	
Oct. 30, 1969....	Near Omaha Bellevue power plant.....	601. 3	Water.....	50 gal.....	Polyelectrolyte.....	4	P2, E7, P2.
			Silt.....	From 50 gal. <sup>2</sup> .....	Beef extract.....	6	E1, P1, E7, P3.
Dec. 11, 1969....	Thacker Marina in Sioux City (above all sewage outfalls).	732. 7L	Water.....	50 gal.....	Polyelectrolyte.....	0	
	Sioux City.....		Silt.....	From 50 gal. <sup>2</sup> .....	Beef extract.....	0	
			Primary effluent.....	2 l.....	Al(OH) <sub>3</sub> .....	82	Not yet typed.
					Protamine sulfate.....	14	Do.
	Sioux City (5 miles below all sewage outfalls).....	717. 0	Water.....	50 gal.....	Polyelectrolyte.....	1	Do.
			Silt.....	From 50 gal. <sup>2</sup> .....	Beef extract.....	3	P3, P3.
Jan. 22, 1970....	St. Joseph Water Works intake line (above sewage outfalls).	452. 3	Water.....	50 gal.....	Polyelectrolyte.....	19	P3, P2, P2, P2, E7, E33, E33.
			Silt.....	From 50 gal. <sup>2</sup> .....	Beef extract.....	0	
	St. Joseph Municipal.....		Primary effluent.....	2 l.....	Al(OH) <sub>3</sub> .....	88	Not yet typed.
					Protamine sulfate.....	5	Do.
	St. Joseph Municipal (meat packing plant).....		do.....	do.....	Al(OH) <sub>3</sub> .....	134	Do.
					Protamine sulfate.....	0	
	Palermo Landing.....	440. 3	Water.....	50 gal.....	Polyelectrolyte.....	1	E33.
			Silt.....	From 50 gal. <sup>2</sup> .....	Beef extract.....	0	
Apr. 23, 1970....	St. Joseph Water Works intake (above sewage outfalls).	452. 3	Water.....	50 gal.....	Polyelectrolyte.....	3	Not yet typed.
			Silt.....	From 50 gal. <sup>2</sup> .....	Beef extract.....	0	
	St. Joseph Municipal sewage treatment plant.....		Primary effluent.....	2 l.....	Al(OH) <sub>3</sub> .....	222	Not yet typed.
					Protamine sulfate.....	66	Do.
	St. Joseph Industrial sewage treatment plant (meat packing plant).		Primary effluent.....	do.....	Al(OH) <sub>3</sub> .....	10	Do.
					Protamine sulfate.....	0	
	Palermo Landing.....	440. 3	Water.....	50 gal.....	Polyelectrolyte.....	3	Not yet typed.
				From 50 gal. <sup>2</sup> .....	Beef extract.....	0	

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<sup>1</sup> Not all viruses recovered have been typed as yet.

<sup>2</sup> Silt taken from profilters used in filtration of 50-gallon samples. Sometimes silt from volumes less than the 50 gal. filtered were used.

TABLE 10.—COMPARISON OF FIELD FILTRATION AND LABORATORY FILTRATION OF WATER SAMPLES ON EFFICIENCY OF RECOVERY OF VIRUSES FROM MISSOURI RIVER WATER AT ST. JOSEPH

Site of sampling		Type of sample	Size of sample	Site of filtration	Virus recovered (PFU/sample)	Virus types recovered <sup>1</sup>
Place	River miles					
Waterworks intake....	452.3	Water.....	50 gal.....	Laboratory.....	3	
			31 gal.....	Field.....	1	E1
		Silt.....	Silt from 50 gal <sup>2</sup>	Laboratory.....	0	
			Silt from 31 gal <sup>2</sup>	Field.....	1	E7
Palermo landing.....	440.3	Water.....	50 gal.....	Laboratory.....	3	
			21 gal.....	Field.....	1	E7
		Silt.....	Silt from 50 gal <sup>2</sup>	Laboratory.....	0	
			Silt from 21 gal <sup>2</sup>	Field.....	2	E7

<sup>1</sup> Not all viruses recovered have been typed as yet.<sup>2</sup> Silt taken from prefilters used in filtration of corresponding water samples.

TABLE 11.—RECOVERY OF VIRUSES FROM FRESHLY PREPARED AND STORED POLYELECTROLYTE PE 60

Virus	Control	Freshly prepared PE 60 (percent)	Stored PE 60 (percent)	Storage (days at 4 C)	
				Before test	After test
Poliovirus 1.....	175	138 (51)	145 (53)	2	3
Echovirus 7.....	79	24 (30)	20 (25)	2	5
Reovirus 1.....	105	33 (31)	9 (8)	2	5
Reovirus 1.....	84	14 (17)	12 (14)	2	2.5

<sup>1</sup> Plaque-forming units.

Mr. RICH. He wrote a paper on the virus hazards of Missouri River, this is the head EPA virologist. He says—I will just extract a couple sentences—

Evidence of fecal coliforms in water is only an indication that hazardous agents may be present. Evidence constituted by many other biological and chemical indicators of pollution is often equivocal, too, because in themselves, these indicators usually cannot be shown to be injurious to health.

He continues:

Viruses are a different matter. Each virus is capable of producing infection. Each virus is thereby a dangerous pollutant. Thus, the detection of a single virus particle is the detection of a dangerous pollutant.

The detection of a virus in a sewage effluent ejected into a waterway constitutes a clear and present danger to health in the area of the outfall, immediately downstream of the outfall, and in communities well downstream when that virus will survive in the stream long enough to reach the downstream communities.

We know virus will survive in an ocean environment today. We spent enough time consulting all these consultants who will tell you, no question the viruses persist. And Dr. Berg indicates that he thinks there is a problem with one virus.

Mr. BAUMAN. Do you agree with EPA's statement you do not have enough data to indicate there is a health hazard?

Mr. RICH. No, I absolutely do not agree with that.

I think it is overwhelming evidence in the record.

Mr. BAUMAN. In the course of your association with EPA, they offered some sort of legal deal to get out of this lawsuit. I wonder if what they suggested is consistent with Federal law?

Mr. RICH. I do not want to do anything that the judge in the district court in Baltimore would be upset with me.

Mr. BAUMAN. Better worry about the chairman. [Laughter.]

Mr. RICH. I only come before this committee once in very many years; I come before that court quite often.

Mr. BAUMAN. I see.

Mr. RICH. See? [Laughter.]

I will say there is a letter to me written by Train, which I think is a matter of public record. I do not know why, you know, the Administrator would write the attorney, therefore I think I can disclose it—indicating, well, we do not think this is a matter that should go before the court, bring it back to the agency, we will give you another adjudicatory hearing like we gave you in Philadelphia, give you a decision within 20 days. And you dismiss your case in court.

Well, I can only be bit a couple of times before I know; I would rather play in court than before the agency.

Mr. BAUMAN. You saw no efforts to compromise to change their position only to allow another procedural—

Mr. RICH. No; I think this was a chance for them to make a record. They obviously did not do almost any environmental assessment.

I do the same thing. If I think I am going to be weak in court, I will bring a party back to the Department of Natural Resources to make my record. I assume they are doing the same thing.

Mr. BAUMAN. Thank you.

Mr. LEGGETT. You talk about seeing viruses in ocean water; I guess the implication of that is it really does not do much good to gargle with salt and hot water if you have a cold?

Mr. RICH. I would not gargle with ocean water.

I lived on the ocean all my life, but I would not—

Mr. LEGGETT. Now, if you were the Director of EPA, what kind of regulations would you promulgate or what kind of research would you do before you promulgate regulations?

Mr. RICH. Well, what I would do is this, I would outlaw all dumping into the ocean except under very unique or unusual circumstances where there was absolutely no other alternative to disposing of a nontransferable toxic waste into the food chain.

I could not allow in good conscience anything to be dumped into the ocean which, if it could get into the food chain, could endanger the public health of the citizens of this country.

Mr. LEGGETT. If you affected the human health and welfare, you would abate it; but if it affected fisheries resources would you abate it?

Mr. RICH. Absolutely.

Mr. LEGGETT. If it affects the marine ecosystem would you abate it?

What I am reading is the law.

Mr. RICH. I know.

Mr. LEGGETT. Yes.

Mr. RICH. I know what you are reading. You know, there is one thing, I do not even like to raise it, but it could in the opinion of our technical people be a safer situation, although I do not think it is, and that is to take it out beyond the Continental Shelf and dump it 106 miles off the coast, as an expedient in an emergency situation.



It is acknowledged once it gets out that far, it is not going to come back onshore, so I think that that type of thinking is an expedient that could be used in short term.

I do not want to see that happen, at least biologically it is very wasteful. But that could be done with much safer impact on shore lines.

You know what my problem is? My problem is having lived in Atlantic City, N.J., most of my life and seeing that area degrade, I wonder what people feel when they know that there is a sludge bed or possibility of sludge bed 10 miles offshore a coastal resort. That bothers me. I do not think it is necessary.

Mr. LEGGETT. As I understand it, at least by the analysis prepared by counsel, EPA managed the New York sludge site to be phased out in 1981; the Philadelphia sludge site in January of 1981; and the Du Pont acid waste disposal in November of 1978. So I suspect that—

Mr. RICH. You have got Camden was the first one, not New York. I think you used the word "New York."

Mr. LEGGETT. Camden, I do not see listed here.

Mr. Mannina, did you prepare this?

Mr. MANNINA. It was prepared by EPA.

Mr. LEGGETT. They can explain it when they come over.

But you think these dates are rather extended anyway, is that right?

Mr. RICH. I know that they are extended because I know what we have done. I mean, we did it. We did it within a year. And that was raw sludge. And we did it at great cost and great effort. It was done and it is safe. We monitor that—you know; we have a hold on it; it is right here; we can look on it. We monitor it and there is no ill effects; we have done it.

It takes effort; that is all it does; it takes a great deal of effort.

Mr. LEGGETT. If there are no other questions, I thank you very much, Mr. Rich, for your most helpful statement.

for your most helpful statement.

Our next witness this afternoon is Mr. Joseph Lojewski, staff assistant for environmental affairs, Du Pont Co.

**STATEMENT OF JOSEPH LOJEWSKI, STAFF ASSISTANT FOR ENVIRONMENTAL AFFAIRS, DuPONT CO., WILMINGTON, DEL.; ACCOMPANIED BY DR. L. L. FALK, PRINCIPAL CONSULTANT IN ENVIRONMENTAL CONTROL, AND DAVID B. SEBREE, ENVIRONMENTAL CONTROL AGENCY**

Mr. LOJEWSKI. Thank you.

Mr. LEGGETT. "Lojewski"?

Mr. LOJEWSKI. Thank you. You pronounced it right the first time.

Mr. LEGGETT. Very good.

Mr. LOJEWSKI. My name is Joseph Lojewski. I am staff assistant to the directors of environmental affairs for the Du Pont Co., and have over 20 years of experience with Du Pont in a variety of technical, manufacturing and management positions.

Accompanying me today are Dr. Lloyd Falk, on my left, principal consultant in environmental control, and Dave Sebree, on my right, environmental control attorney.

I am pleased to accept your invitation to appear before you to present Du Pont's views on the ocean disposal of industrial wastes, and to provide you with information regarding Du Pont's disposal activities, both past and present. I wish to make it quite clear, however, that Du Pont has eliminated many of its barging activities, and is seeking feasible alternatives for those which remain. We hope our views will be helpful to you.

In a discussion of ocean disposal practices, it is important to recognize the dilemma we face in evaluating such activities. On the one hand, oceans are fundamental to our ecological balance. On the other hand, oceans have tremendous assimilative capacities and are a natural and, in many cases, the final depository for waterborne residues from both man and nature.

It is imperative that our oceans be protected from harm resulting from waste deposition whether those wastes find their way to the ocean via our many rivers, or whether those wastes are discharged from a barge or by a pipeline in a specified area.

We are convinced that under properly controlled and monitored conditions, many wastes can be disposed of in the ocean with no detrimental impact on the oceans and our environment. In many cases, it is the most environmentally sound and economic means of disposal.

We believe that when it can be reasonably demonstrated that no adverse effects will result from the disposal of wastes at sea, such disposal is a proper and advantageous use of our resources.

Although we are convinced of these views, we have terminated or reduced several barging practices, primarily because of public misunderstandings and objections, and are actively seeking feasible alternatives for our remaining barge disposal operations.

Du Pont does not endorse indiscriminate ocean dumping. We actively supported the Marine Protection Research, and Sanctuaries Act of 1972 because we felt that the practice should be regulated and that the proper agency was the Federal EPA.

We think the act passed by Congress is a good one and we concur in the policy of Congress as expressed in the act.

In the main, EPA has taken a highly restrictive approach towards applying the criteria embodied in the act, by requiring all dumpers to actively seek and implement alternatives to ocean dumping even when their wastes have met the published EPA criteria.

We think that EPA should give high priority to studies, research and symposia, seeking means to use ocean disposal safely and rationally. The aim should be to allow ocean use, keeping in mind the pressures on inland and territorial waters, the land, and the atmosphere.

The issue is not simply one of direct ocean disposal, since many wastes eventually find their way to the sea. Rather, it is a matter of maintaining broad, farsighted waste management programs. Certainly there are some materials which should not be disposed of at sea. But there are also some materials which, even with treatment, could

cause a more serious problem in the form of land, air or fresh water pollution than if disposed of at sea under strictly controlled conditions.

Long before the passage of the Marine Protection, Research, and Sanctuaries Act, Du Pont barged materials for ocean disposal. Our first experience with the dispersion of wastes in the sea was from our plant at Beaumont, Tex. We employed Dr. Donald M. Hood, then of Texas A. & M., to develop a disposal model based on generally accepted scientific principles, including toxicity analyses of the waste. Our objective was to provide for the controlled discharge and dispersal of the wastes in a fashion which would result in no environmental damage of consequence to the receiving waters. We voluntarily contacted the State pollution control agencies, the Corps of Engineers, and various private interest groups such as commercial fisheries' associations, to inform them of our activities.

Now, since this first experience, Du Pont developed ocean disposal programs for certain wastes but only those for which onsite treatment was either technologically limited, or for which discharge to inland waters would be inappropriate.

I would like to point out that of more than 100 plants in the United States, we have only barged wastes from a very few, and in each case it was perhaps 1, 2, or 3 process streams from as many as 25 or more at the plant involved.

In recent years, however, ocean disposal has been eliminated at all but two of these plants, but not because any harm was occurring. Indeed, all available evidence leads us to conclude that neither short- nor long-term damage ever occurred.

Our main reason for terminating these practices was to positively respond to the opposition from certain regulatory agencies and public interest groups, but we remain convinced that this additional expenditure of resources has penalized our company, the industries we serve and the Nation.

Now, time does not permit a detailed description of each activity, of the precautions taken to assure us no harm of consequence would occur, or of the alternatives developed when barging was stopped. However, two brief examples should be helpful.

Du Pont's Edge Moor, Delaware plant, manufactures titanium dioxide, a white pigment used in the manufacture of paints, paper, printing inks, fibers, food additives, and cosmetics.

The basic raw material in our manufacture of  $\text{TiO}_2$  is ilmenite ore which consists of titanium, iron, and small amounts of other metals and materials. After the titanium has been extracted, the iron and other metals are in the form of chloride salts in a weak acid solution.

For many years this waste material was discharged into the Delaware River. In 1966, as part of the overall program to upgrade the quality of the Delaware River, Du Pont advised the Delaware River Basin Commission that it would voluntarily curtail acid discharges. After evaluating several alternatives, Edge Moor decided to barge these wastes to the sea. The method was judged to be the most environmentally appropriate and was supported by the long experience of NL Industries. Since 1948, it had been disposing of similar wastes in the New York Bight without unreasonable ocean degradation.

At the time Edge Moor began barging, these wastes had no market value. There was no practicable treatment method available. For example, the neutralization of such wastes generates huge amounts of noncompactable sludge which presents an insurmountable land disposal problem. We concluded the only reasonable and environmentally sound method was disposal at sea and in a manner and in a place where marine life would not be harmed.

Before the disposal operation began, a study was made of the site. After the operation started in July 1969, Hydrosience, Inc., and the University of Delaware's College of Marine Studies were employed by Du Pont to study the discharge and the dispersal patterns chosen by Du Pont and the biological impact upon the waters of the receiving area. Now, this study in part was funded by a grant from the Federal Water Pollution Control Administration, EPA's predecessor. Further studies were and are being continued at Du Pont's expense.

The studies of Du Pont, EPA, and others provide adequate scientific data upon which to make an informed judgment of the environmental effects of the Edge Moor disposal operation. To date, these studies indicate no harm either in the dump site or in any contiguous area.

Ferric chloride, the major waste constituent, is an excellent flocculent and phosphate removal agent used in municipal sewage treatment and water purification systems. We are developing this use of the material as an alternative means of disposal, and our degree of success has permitted a 20 percent reduction in the amount of waste barged to sea. In fact, the Blue Plains waste treatment plant serving Washington is one of our important customers.

We are now expanding our facilities to market a more substantial fraction of the waste ferric chloride and we hope this market will grow in the next few years to the point where all or almost all of the ferric chloride will be used in water and sewage treatment systems.

But it is clearly necessary to have an environmentally acceptable disposal method for those amounts of waste which may be generated in excess of sales.

Our studies have shown no environmental damage. A variety of alternative means of disposal have been thoroughly evaluated and one has been developed to the point which has permitted us to reduce the amount of waste disposal at sea. Since this product is clearly of value to society, we believe Du Pont has fully met its obligations as a responsible corporate citizen in this issue, and we should be allowed to continue limited disposal at sea.

Now, my second illustration is that of our Houston, Tex., plant. It is an instructive example of the trade-offs the Nation inevitably faces in trying to balance its environmental, energy, economic, and social objectives.

Wastes at our Houston plant are generated in the manufacture of crop protection and rubber chemicals. These products are obviously of great importance to our society and economic life.

Extensive toxicity tests on the wastes were performed prior to barging. Using the dispersion formulas developed by Dr. Hood, we

established a disposal method and rate of discharge to maintain the concentrations of wastes in the receiving zone at levels far below those which would be toxic or hazardous to the marine life. And again, Du Pont informed various agencies of our activities and obtained letters stating "no objection" to this activity.

Now, with the advent of the Marine Protection, Research, and Sanctuaries Act, substantial new data were developed to satisfy EPA of the acceptability of our disposal method. Additional toxicity analyses were performed on phytoplankton and other small aquatic life. The discharge and dispersion model was restudied and demonstrated to be accurate. All the data, when viewed in the light of the proposed discharge and the disposal limits, demonstrated a considerable margin of safety for the aquatic life in the receiving zone.

EPA issued the permit, satisfied no harm would occur, but conditioned the permit upon Du Pont developing and installing alternative controls.

Consequently, Du Pont developed an incinerator specifically designed to destroy this waste, which is 92 percent water and has almost no combustible value. We now incinerate the waste and in the process tremendous quantities of natural gas are consumed—far more fuel than would be needed to transport this material to a safe ocean disposal site. This treatment method now consumes enough fuel to light and heat about 3,800 homes.

Incineration, environmentally, is an excellent method of waste treatment and control. But given the energy shortage this Nation faces, is it a wiser use of the Nation's resources in this instance?

Mr. Chairman and members of the subcommittee, the management and protection of our environment is complicated and there are no easy solutions to many problems. When we choose unnecessarily expensive solutions to environmental problems, we must recognize that society—the public—ultimately pays those costs, through higher taxes, higher selling prices, the nonavailability of goods, or the expenditure of resources which could be used to solve other problems.

There are many methods of waste management and each contributes to environmental improvement. When an unwise choice is made, we waste our resources and often create more problems than we solve. This is true whether the method is ocean disposal, landfill, incineration, or recycle.

The Du Pont Co. has either ceased ocean disposal at its plants or is actively seeking technologically feasible alternatives. This decision has been made reluctantly, however, and I believe in the long run it will prove to be unsound.

It is clear to us that the Nation's social, economic, environmental, and energy problems are so interrelated that our efforts in one area directly affect our progress in the others. It is extremely important, therefore, to maintain all available alternatives which permit balanced solutions to our problems.

Mr. LEGGETT. Thank you very much, Mr. Lojewski, for a very helpful statement.

You indicate that your company supported most of these environmental bills, et cetera, and I suspect that your company spends considerable funds every year trying to ward off environmental losses

and various other kinds of things. Perhaps you are involved in some of these programs from time to time.

Of course, while you would purport to balance discharges of various kinds of effluent the fellow who was downstream of your effluent who is fishing, who might be affected by a certain type of discharge, really does not want to balance that discharge if he loses one fish.

We had testimony this morning respecting an alleged barge of Du Pont—I do not know whether you were here or not.

Mr. LOJEWSKI. I was not.

Mr. LEGGETT. Well, we had two witnesses this morning; namely, Professor Michael Champ, and Dr. Ferenc Szucs, one from Slippery Rock State College and the other from American U, and they have been doing research with both Federal and university grants, and they did a study behind a Du Pont barge off of Delaware Bay some place, and their brief conclusion from taking samples behind the barge within an hour of the discharge of alleged sulfuric acid was that virtually all of the marine life down to several meters in depth and fish that they dispersed in the discharge area, immediately met their demise. And their further conclusion was that the discharges from these barges of Du Pont under a permit, apparently legal under the existing law, in fact were damaging to the ecosystem, at least in the short run.

Do you have any comment on that?

Mr. LOJEWSKI. Well, I think it is true that there are changes that take place for a short period of time, the pH being one factor I believe that recovers after anywhere from 1 to 4 hours, I believe. I do not remember the exact numbers.

But there is a dip in the pH; yes—pH is the measurement of the acidity.

Mr. LEGGETT. That apparently was .1 and the surrounding water was something like 7.5. And they indicated apparently this stampedes the fish away.

There were no dead indigenous fish. The fish primarily that were dead were the ones they put in the water that they used for testing.

Mr. LOJEWSKI. May I ask Dr. Falk to comment? He has heard Dr. Champ's testimony before and perhaps he can put some perspective on it.

Dr. FALK. I have heard Dr. Champ talk—not at your hearing this morning, but at other hearings and at other places—and he has presented the information on the fish which he put in the cages behind the waste, but I think one point that he failed to mention to you this morning was that the fish he put in similar cages in another area of the ocean, not subject to the waste, also died. So that his controls which are necessary in any valid toxicological test were not satisfactory in accordance with standards which any toxicologist would establish.

So I am not certain exactly what the significance of those in-place fish toxicity tests are if his controls which were affected by being confined to the cages, and so forth, also died in similar manner.

Mr. LEGGETT. Well, he said he did not do any post mortem pathology on the fish. So we do not really know what the reason was for their demise.

Dr. FALK. We do not know why they died in the controls either.

Mr. LEGGETT. There was also some testimony that Du Pont site No. 5 which appears to be along the coast of Maryland and Delaware, that this site will be abandoned or phased out in November of 1978.

Are you aware of what site EPA is talking about?

Mr. LOJEWSKI. I think the permit we have specifies the November 1978 requirement to eliminate barging or ocean disposal.

Is that what you mean?

Mr. LEGGETT. Yes; and is your program to terminate that barging of—

Mr. LOJEWSKI. We are developing, as I mentioned in the testimony, the alternative to barging is the marketing and the use of ferric chloride as treating agent of the treatment system; yes. This is the alternative we are developing right now, have been for a period of time.

Mr. LEGGETT. Very good.

Mr. Sarbanes.

Mr. SARBANES. Mr. Lojewski, I am interested in your view that the ocean ought to be used as a dumping source. I take it that is essentially your position? That it can serve a function in that regard, is that correct?

Mr. LOJEWSKI. Yes; recognizing that the oceans do have some assimilative capacity, and under proper control conditions, to assure that no unreasonable harm would occur.

Mr. SARBANES. If it would be so used, would you share my perception that there would be far more people wanting to dump than the ocean could assimilate?

If the ocean were held out as a dumping source, would not the number of people who would want to dump, industrial, municipal, everybody else, far exceed the assimilative capacity of the ocean?

Mr. LOJEWSKI. Well, I guess also in my testimony I tried to relate that barging or ocean dumping as far as De Pont was concerned was a relatively small number of plants.

Mr. SARBANES. I understand that. I am focusing now on a more general approach.

Mr. LOJEWSKI. Yes. I was trying to use that as an example to carry the point further, by saying where there are means available that can be done, we are not encouraging indiscriminate ocean dumping, by no means.

Mr. SARBANES. I understand that. But if the ocean were available as a dumping source, would you agree with me that the number of people who would want to dump would exceed the assimilative capacity of the ocean?

Mr. LOJEWSKI. I guess I do not know how to answer that question, because it really depends on how many people are dumping, what they are dumping and where it is dumping, does it not?

Mr. SARBANES. Since it is available to them and it is cheaper than other sources, most people would want to take advantage of it, would they not?

Mr. LOJEWSKI. Ocean dumping is available now, to the extent that the law allows it and by permit under the proper conditions of control.

Mr. SARBANES. But if the law does not have that as an objective—let me carry the question one step further. Assuming more people wanted to dump than the ocean could handle, how would you determine who got to dump?

Why should Du Pont be able to dump instead of X company, or Y?

If the ocean were held out as a dumping source, how would you determine who was going to be able to use what is a rather cheap way of disposal.

Mr. LOJEWSKI. I think alternatives available to those specific people for their specific wastes—I think each waste and each process has some unique characteristic to it which either makes it easier or harder to develop final solutions for the handling of that particular waste, so that I think you have to go back and determine what that waste is specifically. What methods are available for it. What the costs are associated with those methods and to try to come up with some balanced solution for these people who want to use that ocean, is assimilative capacity. I think it can be done.

Mr. SARBANES. When you are talking about balanced solution, I think on the last page of your statement you said, I believe in the long run it will prove to be unsound:

“You are balancing the economic costs against the environmental impact”?

Mr. LOJEWSKI. Certainly part of it.

Mr. SARBANES. Generally speaking, you are not balancing one environmental impact against another, e.g. if one alternative of handling the waste or material may have some environmental impact that is potentially more hazardous or potentially more harmful than the sea disposal.

Let's take the first—at the top of page 11, where you say: “Incineration, environmentally, is an excellent method of waste treatment and control.” That, I would take it, would clearly be preferable. You would then strike the balance, would that be correct?

Mr. LOJEWSKI. That would be part of it.

Mr. SARBANES. What would be the other part?

Mr. LOJEWSKI. As I say, environmentally speaking, incinerating is an excellent method; it destroys the materials easily.

It does cost one fair amount of money. If that waste can be handled by disposal in the ocean safely under controlled conditions, the economics, one versus the other, might be the balancing factor in that particular case, yes.

Mr. SARBANES. Then the economics is the consideration?

Mr. LOJEWSKI. Yes.

Mr. SARBANES. Not part of it.

When you said part, I wanted to get what the other part is.

Mr. LOJEWSKI. What I am trying to say is certainly not the whole balance is not all economics, it should be all the environmental as well as the economic aspects.

I mentioned that if it is determined that there is harm being caused in the ocean, then economics obviously is not part of it, if that helps.

Mr. SARBANES. Well, of course, the difficulty with that is there may not be harm caused by your dumping a little but you get into the



whole question that if you hold open the ocean as a dumping source then everybody is entitled in a sense to their crack at it; if you all go out and dump, you are going to destroy the ocean. So you are immediately confronted with the question on what basis are you going to be entitled to dump and X, Y, and Z companies are not going to be entitled to dump, or the A, B, C, municipalities.

I really have not gotten an answer to that question.

Mr. LOJEWSKI. There is a permitting system, this is being done in the same manner through the permitting system of discharges to our inland waterways.

I think it can be done in the same manner for ocean disposal, by permitting system.

Mr. SARBANES. Well, the permitting systems generally, as I understand them, are all designed eventually to eliminate the practice, not hold open the practice.

If you hold open the practice as a permanent solution, then you invite your disposer to seek that sort of remedy, since it is economically most feasible for them.

If you do that, the number of people seeking to dispose will exceed the ability of the system to assimilate them and therefore you are going to have to make judgments as to who gets to do it.

Mr. LOJEWSKI. I think that is right.

Mr. SARBANES. Now, at the moment you get a judgment because the end objective is to stop it altogether; it is in a sense a temporary thing that has been allowed, until an old practice has been phased out. But that is different from saying that it is going to be the practice and everyone is then going to have a crack at having that sort of disposal.

Mr. LOJEWSKI. But I guess if we could move from the ocean for a minute and go to land disposal for the minute, is not that same—does not that same possibility exist for land disposal?

Mr. LEGGETT. It might be helpful if we read the law again.

Section 102 provides that:

The Administrator of EPA may after opportunity for hearing, et cetera, permit ocean dumping if it is determined according to criteria established by the Administrator that such dumping will not unreasonably degrade or endanger human health, the marine environment or the economic potential of the dump site.

In establishing such criteria, consider the need for the proposed dumping, the effect on health and welfare, the effect on fish, effect on eco systems, suitability of alternatives, the effect of the dumping on alternative uses of the ocean, and such other factors as the Administrator deems appropriate.

Obviously the innuendo of No. 5, suitability of alternatives—

Mr. LOJEWSKI. Certainly.

Mr. LEGGETT. Would militate in favor of other kinds of disposal, even if there were very slight degradations.

I think that is the point Mr. Sarbanes was trying to make.

Mr. LOJEWSKI. Again using those criteria, the Administrator would be in position to grant or deny some permits.

Mr. SARBANES. Why should Philadelphia and Camden be allowed to dump their sludge in the ocean and Baltimore and Washington have to develop more expensive means of disposing?

If you are going to hold out to Philadelphia and Camden that they are going to be allowed to use the ocean that way, why should not

other municipalities be entitled to use the ocean that way? The consequence of all municipalities so doing would be to kill the ocean. That is the problem as I see it.

And the same thing would apply with respect to private companies as well.

You say you would like to do this kind of dumping, it is the cheapest thing to do.

In your own testimony you indicate Du Pont is incurring significant expenses, for which I commend you, to avoid this sort of disposal and shifts to other forms of doing it which are environmentally better.

Mr. LEGGETT. Well, hopefully we can move to zero ocean discharge except for things we all agree are totally nonpollutant.

Mr. Bauman.

Mr. BAUMAN. Sir, what is the present status of your permit to dump off the coast of Delaware so far as EPA, was a hearing held recently?

Mr. LOJEWSKI. One-year interim permit was granted in 1975 with the stipulation ocean dumping be terminated by November 1978.

Mr. BAUMAN. You feel ocean dumping of chemicals and other substantive issues as being disposed of is being environmentally sound and economically more attractive?

Why would you suppose if your position is correct, that the EPA has directed we should terminate this dumping by that date?

Mr. LOJEWSKI. Well, we have not agreed with them.

You know, they grant the permits and that is the stipulation in the permit.

I think we have tried to show them what we feel is an environmentally safe method for disposal of these materials.

Mr. BAUMAN. I guess it is a little flurry for EPA and Du Pont, but when it comes to chemical analysis of chemical products [inaudible]—however, they have not accepted today, under commerce of the statute under which they operate.

There must be significant evidence on the other side.

Mr. LOJEWSKI. I do not know, there is scientific evidence other—by anybody.

Mr. BAUMAN. That is the only other question, I noticed throughout your statement, typical on page 5, you said you would terminate all but two of these plants, but not because any harm was occurring, but you said "Indeed, all available evidence leads us to conclude that neither short- nor long-term damage ever occurred."

You achieved a similar statement throughout.

I do not think you dispute the fact that there was a large 10-mile-long, 1-mile-wide, whatever the statistic is, dead ocean for temporary period of time, at least  $2\frac{3}{4}$  hours after that particular dump occurred. Do you dispute that?

Mr. LOJEWSKI. Well, I think your choice of words perhaps is what we would dispute.

The fact is there are changes that take place and pH, the measure of acidity, is one. There are some effects that are short lasting. But the recovery occurs after a relatively short time also.

Mr. BAUMAN. So then it is not correct to say there was never either short- or long-term effect occurring?

**Mr. LOJEWSKI.** I guess within the context of an unreasonable damage to that environment or, let's say, making that environment unavailable for the use for which it was intended, I do not think we have done any harm to it.

**Mr. BAUMAN.** Thank you.

**Mr. LEGGETT.** Your testimony has been very helpful, and certainly I would hope that you continue to cooperate and give us the views of your company with respect to the operation of the law and the statute, and if you severely disagree with it, certainly you are entitled to be heard.

**Mr. LOJEWSKI.** Thank you.

**Mr. LEGGETT.** I understand Mr. Oostdam is sick.

Is there anybody else who wants to testify at this point? If not, the meeting will adjourn until next Thursday at 9:30.

[The following was submitted for inclusion in the record:]

**E. I. DU PONT DE NEMOURS & Co., INC.,**  
*Wilmington, Del., February 26, 1976.*

**Ms. FRANCES STILL,**  
*Chief Clerk,*  
*U.S. House of Representatives,*  
*Longworth House Office Building,*  
*Washington, D.C.*

**DEAR Ms. STILL:** My testimony on Ocean Dumping was presented to the committee on January 23, 1976 and requires only very minor changes as shown on the attached typewritten pages 121, 122, 129, 130, 132 and 133.

Also, I feel it would be helpful to supplement my responses to questions raised by Mr. Sarbanes and Mr. Bauman and I respectfully request that these supplemental remarks be included in the final transcript.

Mr. Sarbanes developed a line of questioning beginning on page 131, which was aimed at discouraging ocean disposal. Mr. Sarbanes asked several questions along these lines: If the number of people seeking to dump will exceed the assimilative capacity of the ocean, how would we determine who should be allowed to dump?

I submit that EPA has developed a permit system for inland waters where the problem is even more acute and this system is functioning and producing results.

The size of an inland stream, the type of wastes to be discharged and the impact of these wastes on the desired uses of the stream, all are taken into consideration before a permit is issued. In some instances, industries will not be able to locate on a stream which is water quality limiting. I believe a similar arrangement using the permit criteria embodied in the Act is an appropriate way to determine who should dump in the ocean.

Not everyone will want to discharge into the ocean and many simply cannot because it is not feasible for them to do so. Distance, volume of waste, type of waste, alternatives available all have a bearing on the decision.

It should be recognized that alternatives to barging may create unacceptable environmental problems and use tremendous amounts of valuable resources with little or no commensurate benefits. It is possible to create negative environmental effects, that is produce more pollutants than we originally started out with.

William Ruckelshaus, Administrator of the EPA at the time the "zero discharge" goal of the Federal Water Pollution Control Act Amendments of 1972 was being debated brought up the question of what would happen to pollutants kept out of the water. He suggested they would go into the air and the land, and asked "Is this the best place to put them? The bill assumes yes. Such an assumption is unwise and unsupportable."

The chief environmental officer of a large chemical company—not Du Pont—calculated what would be required to completely remove 4,000 tons of pollutants from the discharge stream of one of his company's plants. To build the abatement equipment, and to produce the chemicals and supply energy used in its

operation; he said his company would have to consume 40,000 tons of natural resources and generate 10,000 tons of pollutants in the form of air pollution and solid waste.

When controlled, monitored, and environmentally sound ocean dumping practices are prohibited, they may have to be replaced by less sound or unproven practices with greater potential for adverse impact.

Mr. Bauman commented (page 139) on the testimony of Dr. M. A. Champ to the effect that there was a large ten-mile-long, one-mile-wide dead ocean. This statement conjures up a vision of a desert; no living thing in the entire area. There is no data which would support such a statement. Published intensive studies of the dump area over a period of several years show various investigators continue to find a normal abundance of diverse flora and fauna, on the bottom and in the water column. No fish kills have ever been reported.

In addition, testimony by Dr. L. L. Falk on October 29, 1975 at Rehoboth Beach (which has been submitted to your committee) describes studies that show the concentration of waste rapidly disperses behind the barge to a level expected to be non-harmful to sensitive marine organisms such as *Acartia tonsa*, (a zooplankton) and that pH returns to normal in less than one hour. Studies by Woods Hole Oceanographic Institution and others (1) on the NL Industries dump site where similar wastes have been dumped since 1948 detected "no major effects of acid-iron wastes on the sediment and biota of the region."

All evidence indicates the statement that there is a one-mile by ten-mile dead ocean resulting from our disposal practice is clearly erroneous.

Very truly yours,

J. D. LOJEWSKI,  
*Staff Assistant, Environmental Affairs.*

Attachments.

(Committee Note—The attachments were placed in the files of the subcommittee.)

[Whereupon, at 3:30 p.m., the hearing recessed, to reconvene at 9:30 a.m., Thursday, January 29, 1976.]

## OCEAN DUMPING

THURSDAY, JANUARY 29, 1976

U. S. HOUSE OF REPRESENTATIVES,  
COMMITTEE ON MERCHANT MARINE AND FISHERIES,  
SUBCOMMITTEE ON OCEANOGRAPHY AND  
SUBCOMMITTEE ON FISHERIES AND  
WILDLIFE CONSERVATION AND THE ENVIRONMENT,  
*Washington, D.C.*

The subcommittees met, joint session, in room 1334, Longworth House Office Building, at 9:30 a.m., Hon. Robert L. Leggett (chairman) presiding.

Mr. SARBANES [presiding]. The subcommittees will please come to order.

We will get started at this time.

I understand the chairman of the subcommittee is on his way to the hearing.

The witnesses are present and I think we best proceed.

This morning the Subcommittee on Fisheries and Wildlife Conservation and the Subcommittee on Oceanography will continue their joint oversight and authorization hearings on the Marine Protection, Research, and Sanctuaries Act of 1972, commonly known as the Ocean Dumping Act.

In this regard, I might announce at this time that on Monday of this week Chairman Sullivan and other members of the subcommittees introduced H.R. 11505, a bill that would extend all three titles of the Ocean Dumping Act for 1 additional year; that is, through fiscal year 1977, and at the same level of funding authorized for fiscal year 1976, which is as follows:

For carrying out the purposes of title I, \$5.3 million; for carrying out the purposes of title II, \$6 million; and for carrying out the purposes of title III, \$6.2 million.

The bill and the departmental reports, when they are received by the committee, will appear in the record at this point.

Before calling the first witness, I would like to announce that the subcommittees have 2 more days of hearings scheduled on this matter, the first being in New York City on February 20, and the second being here in the committee room on February 27, beginning at 9:30 a.m.

Our first witness this morning is Dr. Andrew W. Breidenbach, Assistant Administrator for Water and Hazardous Materials, Environmental Protection Agency.

Dr. Breidenbach, I gather you are accompanied by Mr. Rhett. Is that correct?

**STATEMENT OF DR. ANDREW W. BREIDENBACH, ASSISTANT ADMINISTRATOR FOR WATER AND HAZARDOUS MATERIALS, ENVIRONMENTAL PROTECTION AGENCY; ACCOMPANIED BY KENNETH BIGLANE, DIRECTOR OF THE OIL AND SPECIAL MATERIALS CONTROL DIVISION AND T. A. WASTLER, CHIEF OF THE MARINE PROTECTION BRANCH, OIL AND SPECIAL MATERIALS CONTROL DIVISION**

Dr. BREIDENBACH. No, Mr. Sarbanes, I am accompanied by Kenneth Biglane, Director of the Oil and Special Materials Control Division on my right, and T. A. Wastler.

Mr. SARBANES. Could the gentlemen please identify their positions as well for the subcommittees?

Mr. BIGLANE. Mr. Chairman, I am Director of the Division of Oil and Special Materials Control Division.

Mr. WASTLER. I am Chief of the Marine Protection Branch within that Division.

Mr. SARBANES. Dr. Breidenbach, let us proceed.

Dr. BREIDENBACH. Thank you, Mr. Chairman.

It has been almost 8 years since the Marine Protection, Research, and Sanctuaries Act of 1972 became effective. I welcome this opportunity to discuss with you our progress in implementing title I of the act.

In my prior position as Director of the National Environmental Research Center in Cincinnati, Ohio, I was deeply involved in determining agency policy towards programs and problems which affected the Center. In my present position, I also am deeply involved in determining agency policy toward programs and problems which affect areas under my authority.

In making policy determinations, it is necessary to evolve positions from several points of view. In a complex area, it is only natural that several points of view exist within EPA and outside the agency. Ocean dumping is such an area. After considering and evaluating the various points of view offered, we determined a policy pursuant to which EPA's ocean dumping responsibilities are being carried out.

The Marine Protection, Research, and Sanctuaries Act of 1972, as amended, was enacted in response to a national concern that the dumping of waste into the ocean was affecting the marine environment in an adverse manner.

In addition to addressing the problem of domestic ocean dumping, the act is the enabling legislation for the 1972 International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.

This convention entered into force in September 1975, when the required minimum number of nations ratified it. In accordance with the provisions of article XIV(1) of the convention, the first meeting of the contracting parties was held in London, England, on December 17 and 18, 1975. Attending were delegations representing the 22 contracting parties, 50 observer States and 18 observer organizations.

After some discussion, the contracting parties adopted a resolution designating the Intergovernmental Maritime Consultative Organiza-

tion (IMCO) to be responsible for the Secretariat duties relating to the convention. Guidelines for the agenda and suggested scheduling for the first consultative meeting were then discussed, and it was scheduled tentatively for September of 1976.

It is the policy of the act to regulate all ocean dumping and to prevent or strictly limit the ocean dumping of any material which would affect the marine environment adversely. To implement this policy, title I of the act establishes a system of permits to be administered by EPA and the Corps of Engineers to control dumping in ocean waters. The transportation from the United States of any radiological, chemical, or biological agent, or high-level radioactive wastes for dumping in ocean waters, the territorial sea or the contiguous zone is prohibited. Transportation for the purpose of dumping of other materials except dredged materials, is prohibited unless the Administrator of EPA has issued a permit.

The Administrator is empowered to issue a permit after a determination by him that the dumping will not unreasonably degrade or endanger human health or the marine environment.

The dumping of dredged material is regulated by the Corps of Engineers in consultation with EPA.

Title I also requires the Administrator to promulgate criteria for reviewing and evaluating permit applications, which must include an examination of the need of the proposed dumping and the alternatives available to the proposed dumping. Because of time constraints, interim criteria were developed in April and May of 1973, based on the state of knowledge known at that time of the impact of waste materials on the marine environment.

Final regulations and criteria, published in October of 1973, were based on initial operating experience with the program and on public comment on the interim documents.

The criteria which have been established largely from laboratory experimentation are the basis upon which permits are issued or denied. They contain detailed quantitative test requirements and test procedures which are intended to estimate probably environmental effects of disposed materials.

Surveillance of dumping activities is assigned to the Coast Guard by the act. The Coast Guard's enforcement program is keyed to close surveillance of the disposal of toxic materials with spot checks of the nontoxic material dumps.

EPA has the authority to assess civil penalties for violation of permit conditions and there is also a provision for criminal action against persons who knowingly violate the act.

In exercising its regulatory authority over ocean dumping, EPA has taken a strict, highly restrictive approach by requiring all dumpers to seek environmentally acceptable alternatives to ocean dumping even when their wastes have met the published EPA criteria for issuing permits.

EPA has taken this approach because, while the criteria are adequate to base a short range determination of the impacts of waste materials on marine ecosystems, there is a general lack of specific knowledge concerning their long-range impacts.

Since 1972, EPA has brought all ocean dumping in the United States under full regulatory control and has required many dumpers

either to stop dumping immediately or to phase out their dumping activities within the next few years.

On the Atlantic coast alone, 75 former dumpers have ceased ocean dumping. An additional eight dumpers are scheduled to be phased out of ocean dumping by June 1976, and of the 24 industrial permittees now dumping in the Atlantic under permit from EPA's Region II Office, only six will not be phased out by December 1977. Moreover, the cities of Philadelphia and Camden are required to end ocean dumping of sewage sludge by or before 1981.

In the Gulf of Mexico, ocean dumping has decreased considerably as industries have been required to implement alternative methods of disposal. By the end of 1976, the volume of waste dumped in the gulf is anticipated to be down to 10 percent of the volume dumped in 1973.

The attached tables illustrate the volumes of wastes dumped during the past 3 years, those dumpers already phased out, and those who will be phased out in the near future. These tables show that over the past year the total amount of wastes dumped in the ocean has decreased 20 percent.

Two recent decisions of Administrator Train—one in October of 1974 and one in September of 1975—have reflected our concern for the marine environment as well as our commitment toward phasing out the dumping of toxic pollutants.

In the 1974 decision, Mr. Train denied a permit to the Du Pont Co. in Belle, W.Va., because there were inadequate scientific data upon which to make an informed judgment of the probably environmental effects of the proposed dumping. Since that time, Du Pont has conducted additional studies on the effects of dumping to support a new permit application.

However, its application is being held in abeyance until further investigation can be made into alternatives to ocean disposal.

In the 1975 decision, Mr. Train upheld the decision of EPA's Region III Office requiring the city of Philadelphia to phase out the ocean dumping of sewage sludge by 1981. Even though the information on the immediate impact of the Philadelphia sewage sludge on the marine environment was subject to differing interpretations, the Administrator felt that the evidence presented had not demonstrated that there would be no endangerment to the environment if Philadelphia were allowed to continue dumping.

In addition, Mr. Train stated that methods of onland disposal of sewage sludge could be implemented by Philadelphia successfully.

Despite making significant progress in carrying out our congressional mandate to prevent or strictly limit ocean dumping of any material that would affect human health adversely or the marine environment, we have encountered many problems in administering the act. In dealing with these problems our thinking concerning the entire problem of marine pollution and what can be done about it, has matured.

At this time, I would like to present to you some of these problems and our thoughts on the entire problem of marine pollution.

Our initial problem concerned the paucity of scientific knowledge on the effects of continued ocean dumping on the marine environment. Despite this paucity of knowledge criteria had to be developed to evaluate permit applications.



"Since the promulgation of the original criteria, studies and research conducted on marine pollution have increased our scientific knowledge significantly. We are now on the verge of promulgating new criteria which will permit us to evaluate permit applications more effectively.

However, a knowledge gap still remains. While certain improvements in the crucial area of techniques for conducting bioassays allow us to evaluate the immediate effects of pollutants on specific marine organisms, the general state of scientific knowledge has not advanced sufficiently for us to determine the long-range ecological effects of continued ocean dumping. The development of better techniques and subsequent implementation of these techniques in our research operations will take considerable time and will be expensive.

While our scientific and technical capabilities undoubtedly will continue to improve, we must recognize that regulating the ocean dumping of wastes is a small part of the problem of protecting the marine environment. Enormous volumes of wastes enter the ocean from a variety of other sources—through ocean outfalls, from land runoffs and directly from rivers and estuaries.

We also must recognize that the marine environment is a part of the total environment. Problems which affect the marine environment and solutions to these problems must be viewed in terms of their interrelationship with the total environment.

For example, EPA, under the mandate of the act is in the process of phasing out ocean dumping, but this creates other environmental problems. Some alternative form of disposal must be developed for each waste that is phased out of ocean dumping.

Considerable research is going into the development of alternative methods of disposal which will reduce the environmental effects of the ultimate disposal of the unavoidable residue—be it solid, liquid or gas—either on the land, in the water or in the air.

At the present, we are exploring the alternatives to ocean dumping as they may present a more acceptable ultimate environmental impact than ocean dumping. We are concerned particularly about the problem of the ultimate disposal of sewage sludge which will be produced in ever increasing quantities as municipalities install more advanced forms of sewage treatment.

Research on alternative methods of sludge disposal is continuing with emphasis on beneficial utilization, for example, land application for soil enhancement, the production of energy or resource recovery.

There are essentially three alternatives to ocean dumping for the disposal of sewage sludge. These are land application, landfill, and incineration.

Each of these alternatives has its problems. Land application is a technique in which sludge is processed to make it suitable as a fertilizer or soil conditioner. Landfill is a technique in which raw or digested sludge is merely placed on the land and allowed to decay under ambient conditions.

In both of these applications there is a potential for pollutants—particularly trace metals—to leach into groundwater or to enter the food chain through plants and animals. However, no link to adverse health effects from land disposal has been conclusively demonstrated. On the other hand, it is the effects of these trace metals which are

among the major problems with the disposal of sewage sludge in the ocean.

Incineration is the third technique which generally is applicable as a means of sludge disposal. A number of different techniques for incineration exist and this is a widely used alternative in many areas. However, there is the general problem of residues containing trace metals.

At present, the elimination of ocean dumping is a laudable goal. We must continue to pursue alternative methods of waste disposal. However, there are many remaining unanswered questions regarding the overall problem of the pollution of the marine environment, what we know about it, and what are the impacts of alternative methods of disposal.

There may be circumstances where ocean dumping of certain wastes may cause no harm to the ocean or may be the most overall environmentally acceptable solution. Thus, while we are continuing to scrutinize carefully all applications for ocean disposal permits to insure that harmful dumping is eliminated as rapidly as possible, we are at the same time investigating the broader problem of waste disposal to develop the most environmentally accepted waste management program.

This concludes my prepared remarks. I will be happy to answer any questions.

Mr. SARBANES. Thank you, Dr. Breidenbach.

Mr. Mosher?

Mr. MOSHER. Thank you, Mr. Chairman.

Mr. Chairman, there is absolutely no reference in Mr. Breidenbach's testimony concerning the funding levels. After all, these are authorization hearings. I assume, at least, that is part of our agenda. Do you want to comment on the authorization levels proposed in H.R. 11505? As you know, these levels are higher than the levels proposed in the administration's budget.

Dr. BREIDENBACH. Yes, they are. Yes, I would like to address that.

In attacking the problems of environmental pollution and bringing to bear the forces in EPA on all of those problems and taking into consideration the budget requirements to maintain a stable economy, we have to balance as best we can the amount of effort we put into the several environmental programs which we administer and the environmental problems within the areas that these programs cover.

In our best judgment, in terms of the emphasis we must put on ocean dumping in relation to the myriad other programs that are required in terms of the other statutes we must implement, the funding levels that we request are at the appropriate level.

Mr. MOSHER. In other words, I think you are saying that because of the necessary budget constraints, you are asking for a lot less than you really can effectively use?

Dr. BREIDENBACH. It is certainly true that if there were more money in this program, we could move a lot faster. However, in deciding what is put into this program as opposed to consideration of other programs for which we have responsibility, we feel that this is the appropriate amount.

Mr. MOSHER. But you could use effectively other larger amounts if the Congress authorized it and it was appropriated.

Dr. BREIDENBACH. Additional funds could be used effectively in administering our ocean dumping program.

Mr. MOSHER. As I understand it, not only EPA but NOAA and the Corps of Engineers have ocean dumping research activities, or the responsibility for those activities.

How are those research activities coordinated, that is, between those three agencies and what are the priorities among those agencies?

Dr. BREIDENBACH. In our research program we are studying the marine ecological effects of developing better methods for bioassays.

Mr. MOSHER. For what?

Dr. BREIDENBACH. Bioassays are a scientific technique for determining the effect of various substances, which are being dumped in the ocean, upon living marine organisms and the accumulation of these substances in these organisms.

Our objective, of course, is to prevent deterioration of the marine environment. We must know how the substance impacts upon the organisms in the ocean. One method of doing this is bioassays. Following my testimony, you are going to have a panel which can address the research program in much more depth than I can.

To return to your question concerning communication, in the short tenure of my job and having come from a research organization, I can assure you that the communication between the Corps of Engineers and NOAA and EPA is good.

Mr. MOSHER. Do you think you have a coordinated mechanism?

Dr. BREIDENBACH. Yes, sir.

Mr. MOSHER. Now, on page 8 of your testimony you emphasize the need for better techniques and research but you say that it will take considerable time and expense to develop those techniques so there is an example of where you do, indeed, need more funding.

What type of better techniques are needed?

Where is this expense?

Is it in the development of an innovative use of more hardware or what will these steps be?

Dr. BREIDENBACH. It probably can be divided into two steps.

Before I go on, I would like to point out that the fund for research comes through the research and development allocation and are not part of the moneys that are authorized by this committee.

Mr. MOSHER. Yesterday, in the Science Committee, we were hearing authorization for EPA's R. & D.

Do they come out of those funds?

Dr. BREIDENBACH. They come out of those funds.

Now, there are really two types of research that are needed.

One is to develop new techniques for better monitoring of these dump sites so that we can get more accurate, more dependable and more valid information on which to base and to make decisions on whether or not we are adversely affecting the marine environment.

Another set of research which is equally as important is research into new and better alternatives for ocean dumping. Because of the pressure for such alternatives in cities like New York and Philadelphia, we are giving emphasis to this research.

Mr. MOSHER. Well, now, I think EPA's annual report indicated that incineration of toxic wastes can be 99 percent effective and you list that as one of the three alternatives, but you say that there is the general problem even there of residues containing trace metals.

Do you want to expand just a little bit on that and on that alternative?

Dr. BREIDENBACH. On the incineration alternative?

Mr. MOSHER. Yes. Which in the annual report you indicate is 99 percent effective, but you still have some doubt about it, I guess.

Dr. BREIDENBACH. Incineration of sewage sludge causes a number of technical problems. For example, we are not at a point where we can answer the question whether or not the emissions of incineration will meet our air quality standards, which is another of those responsibilities I addressed in my testimony. However, it is being done successfully in some instances.

Mr. MOSHER. Do the trace metals go into the air?

Dr. BREIDENBACH. Some of them may, yes.

Another large portion will come out in the residue from the incinerator and there is the problem of having to dispose of the residue in landfills or some other type of land disposal.

It would be far better, of course, if there were no trace metals in the residue which would permit the incorporation of this residue with other residue to form a suitable landfill.

Mr. MOSHER. Is it likely that you will ever find the perfect alternative?

Dr. BREIDENBACH. I dislike to use the word "perfect."

We are looking for the best alternative, the one most environmentally acceptable, and the most cost effective.

Mr. MOSHER. And you are not sure which that is as yet?

Dr. BREIDENBACH. I do not think we will ever be able to say that for all sewage sludge there is one single alternative.

It may well depend upon the location, the climate, the available land, the cost of that land, and many of the factors that would make the decision have more of a local focus than a national focus.

We must look at each one of these factors. We are trying to develop an array of alternatives so that these alternatives could be selected on the basis of the factors existing in a given locality.

Mr. MOSHER. Well, that seems to make sense.

It has the ring of truth about it.

I am afraid that it is one more indication that all our problems are complex.

Thank you, Mr. Chairman.

Mr. SARBANES. Mr. Forsythe?

Mr. FORSYTHE. Thank you, Mr. Chairman.

Thank you very much for your statement, Dr. Breidenbach.

Just to follow on with the line that Mr. Mosher was inquiring about, how much research effort is going to recycling of waste since you are dealing with sewage effluent sludge?

Is this field getting the attention it should be getting?

Dr. BREIDENBACH. Yes, I believe the program on the recycling of sewage sludge, particularly in land application of sewage sludge, is receiving adequate attention. It is one of the highest priorities in our Research and Development office. The subject of how we can take the sludge and manage it in a way in which it is an acceptable amendment to the environment and principally on land based situations is discussed frequently within the Agency.

Mr. FORSYTHE. How about the area of biological conversion and usage, to produce methanol and methane.

It seems to me we are hearing of a lot of uses that could be made here so we can recapture an awful lot more before we get down to that final point.

Dr. BREIDENBACH. Yes, sir.

One of the vexing problems with the land application is those same trace metals that concern us in the ocean situation. We are worried that these trace metals will enter the food chain through plants or leach into the ground water. The Department of Agriculture and the Food and Drug Administration have serious reservations about the cadmium and zinc in the soil.

Mr. Forsythe, one of my immediate interests is that we find some way through research to remove the trace metals in the wastewater treatment process, so that the sludge does not have these in it when it is applied to the land.

Mr. FORSYTHE. Incineration and putting it on land.

Dr. BREIDENBACH. Another alternative is pyrolysis which looks very attractive. It needs further testing, but it does not have the kind of air pollution problems associated with conventional incineration.

Sludge, of course, has a higher percentage of water content, and the question is, whether or not you have to burn valuable fuel to drive off that water. In these days of energy shortages, this consideration must be factored into the equation.

Mr. FORSYTHE. I have had one scientist tell me just to put the solid wastes in with the sludge which would then increase the problem of what we are trying to convert or which creates another problem?

Dr. BREIDENBACH. We are exploring the other alternatives.

Mr. FORSYTHE. These hearings cause me to wonder about our lack of ability to find answers and whether we should be more concerned about the research—about what to do with sludge and waste instead of moving these problems from one place to another. If we do stop this ocean dumping and put it in landfill we have the toxic trace metal problem.

We have the PCB problem which we are dealing with in subcommittee at the present time, and it seems to me that the same problem exists there, that we just move it around, and do not solve the problem.

What are your comments with respect to that?

Dr. BREIDENBACH. Well, I do feel that we have a lot to learn in the way of developing a new alternative.

I think one of the boxes we got into many years ago is that as we developed processes to clean the water the problem of the disposal of sewage sludge was neglected. The major objective was to create an effluent acceptable to streams and estuaries without regard to the resulting sewage sludge.

I do not feel we paid enough attention in developing a process to the business of producing an acceptable sludge.

Now we are paying the price of not being able to see far enough into the future to perceive the research needed on how one manages sludge.

Mr. FORSYTHE. How about the tertiary question?

We are now in secondary treatment.

What is the future of tertiary? Is there a way it can economically get into the system and does it get us anywhere?

Dr. BREIDENBACH. Tertiary treatment will take out specific, troublesome components in specific locations. For example, if it were neces-

sary to remove certain substances such as matters nitrogen in larger quantities than happens in secondary treatment to meet water quality standards then tertiary treatment could be implemented.

However, Mr. Forsythe, it would produce more sludge with which we ultimately have to deal.

Whether or not tertiary treatment should be implemented will be determined on a case by case basis.

The value of the resource you are protecting, whether it be a lake or stream or the ocean, must be compared with the cost to go to that higher level of treatment.

One must compare what one gets for that extra level. The 92-500 law sets out the best available treatment as a goal to be obtained by 1983 and we are presently involved in looking at situations which ask the very question that you are addressing, which is, how much additional benefit do we get from going from the level at which we are now to the tertiary treatment.

Mr. FORSYTHE. Thank you very much, Dr. Breidenbach.

Thank you, Mr. Chairman.

Mr. LEGGETT [presiding]. Thank you very much, Ed.

Mr. Sarbanes?

Mr. SARBANES. Dr. Breidenbach, is EPA issuing any new permits for ocean dumping?

Is anyone being given a permit to dump who had not heretofore been dumping?

Dr. BREIDENBACH. I would like to let Mr. Biglane answer that question.

Mr. BIGLANE. The answer to your question, sir, is no; we have no new ocean dumping permits being given.

Mr. SARBANES. So the only people that are dumping are those who are already dumping, trying to phase them out, is that correct?

Mr. BIGLANE. Yes.

Mr. SARBANES. I must say, I am struck by your testimony which indicates, it seems to me, that all of the alternative methods you talk about are preferable to ocean dumping, are they not?

Dr. BREIDENBACH. We are not at the point where we can say they are preferable in every instance.

We do think in the case of Philadelphia, that the alternatives are available. Availability of alternatives was the basis for Mr. Train's decision to deny Philadelphia's request to extend its permit beyond 1981.

Mr. SARBANES. Well, I would certainly hope so; 1981 is 5 years away. That strikes me as a rather long period of time.

Dr. BREIDENBACH. A lot of things have to be done in those 5 years.

One has to first determine that the alternatives chosen will be adequate. Because of the volume of sludge that Philadelphia produces this is a difficult determination.

Mr. SARBANES. If you regarded it as an emergency matter and proceeded at full speed ahead with respect only to technological considerations, not with respect to the will to do the job, how long would it take to do the job in the Philadelphia situation?

How long would it take to have an alternative disposal means?

Dr. BREIDENBACH. If you went all out to build the plant after you get your design specs, 2 to 8 years.

Mr. LEGGETT. If the gentleman would yield, we have some testimony from the assistant attorney general from Maryland, that in the Blue Plains case, where they were under court order, they solved a rather horrendous problem in this area covering several counties in two or three States on the Potomac.

They provided a transportation system, I think, within an 18-month period of time.

The implication of the witness was that that can be done by any of the States.

Have you critiqued that?

Dr. BREIDENBACH. Well, you are addressing two situations at two different locations.

Mr. LEGGETT. I understand that.

Dr. BREIDENBACH. From what I know of the Philadelphia situation, I stand by my estimate.

Mr. SARBANES. What do you mean by that?

Dr. BREIDENBACH. I think if you went all out to design and build a facility to handle Philadelphia's sludge it would take 2 or 3 years to turn the key.

Mr. SARBANES. How do you square that with the fact that it was accomplished apparently in a much shorter time in another area with another—apparently, a comparable problem?

Dr. BREIDENBACH. I cannot square that because I do not know the details of the Blue Plains problem.

To repeat, Philadelphia is a different location.

I do not know what adjustments have to be made, what it is going to take to get the land, how long it will take to get materials, how long construction will take and how long the checkout will take.

Those kind of things as well as determining which alternative Philadelphia should implement will take time.

Mr. LEGGETT. If the gentleman will yield further, what is being done in the Camden area to solve this problem this year?

Mr. SARBANES. Nothing.

Mr. LEGGETT. The problem is, you are giving us some conclusions and we have some contrary information and probably what would be best if you would just sledge hammer this issue and pound it out so we can make some comparison as to whether or not the Camden area and other dumping areas are responding as aggressively as other States that have been subjected to severe court orders and just conclusions do not help us very much.

I think that is what Mr. Sarbanes was trying to get at, is it not?

Mr. SARBANES. Yes.

Dr. BREIDENBACH. I will supply a detailed account of the Camden situation for the record.

[The following was received in response to the foregoing:]

#### SUMMARY OF EPA ENFORCEMENT ACTION AGAINST CITY OF CAMDEN

On November 30, 1974, two NPDES permits were issued to the City of Camden. One permit is for the discharges of treated wastewater from the Main STP to the Delaware River and is numbered NPDES Permit No. NJ-0026182. The other permit is for the discharge of wastewater from the Baldwin's Run STP into the Delaware River and is numbered NPDES Permit No. NJ-0024481.

Plant inspections conducted in the month of June '75, revealed violations of numerous permit conditions on the part of the City leading to the decision that

enforcement action be instituted. Two Administrative Orders were issued on July 25, 1975. The Order for the Main plant is numbered Docket No. NPDES 11-75-34. The Order for the Baldwin's Run plant is numbered Docket No. NPDES 11-75-38.

The City's report submitted in compliance to the Orders was determined to be insufficient to satisfy the requirements of the Orders. In view of these insufficiencies, EPA determined that further legal action was necessary to effectuate compliance. To accomplish this end a detailed Referral Report was drafted and hand-delivered to the U.S. Attorney, District of New Jersey on February 12, 1976 and the U.S. Attorney instituted civil action on March 8, 1976.

A regional incinerator for Camden and 22 surrounding municipalities will be completed in 1980. This will solve Camden's ocean dumping problem. In the interim, landbased alternatives to ocean dumping are being explored. Camden must submit a summary of landbased alternatives available to it by April 30, 1976 to EPA.

Mr. LEGGETT. I understand, but I want you to be on top of that on a daily basis.

Dr. BREIDENBACH. On what kind of a basis?

Mr. LEGGETT. On a daily basis.

Dr. BREIDENBACH. A daily basis?

Mr. LEGGETT. Yes.

Dr. BREIDENBACH. I will do my best.

Mr. SARBANES. It is still not clear to me why these alternatives that you mention are all preferable to ocean dumping—incineration, land-fill, and land use.

Are they not preferable to ocean dumping?

Dr. BREIDENBACH. Leave out the question of cost, these alternatives may be preferable but as I indicated in my prepared testimony these alternatives may cause environmental problems.

Mr. SARBANES. Well, let me put the question of cost to you.

If you are going to use ocean dumping because it's cheaper, how are you going to determine who gets to dump and who does not?

Dr. BREIDENBACH. We are not going to determine that.

We are phasing out ocean dumping. We have stated that in the testimony.

We are moving to end ocean dumping as soon as we possibly can.

You asked me if the alternatives were not preferable.

Yes, they are.

Mr. SARBANES. That you stated flatly without qualification, I think.

Dr. BREIDENBACH. If you leave out the cost.

Mr. SARBANES. Were you leaving out costs or putting in costs?

Dr. BREIDENBACH. We have developed alternatives and ultimately the cities must choose the alternative that best meets its problem, pay the cost of implementing the alternative and use the alternative instead of ocean dumping.

Any alternative probably will be much more expensive for a municipality to dispose of its sludge than by dumping it in the ocean. As a result, the argument is being made that the cost makes these alternatives non-preferable solutions.

The cessation of ocean dumping remains our goal and we are pursuing it at the most rapid rate of speed given all of the problem of developing and having dumpers implement alternatives.

Mr. SARBANES. Well, I guess the phrase "most rapid rate of speed" causes me some concern.

We have some testimony, for instance, and I will read this to you:

In authorizing dumping by the City of Camden, for instance, the EPA is prolonging the non-treatment of sewage waste by the Camden facility. This facility



was built in 1955 and in 1965 it had some problems with its vacuum filters which are the mechanisms used to absorb liquid from the sludge.

"The operator of that plant stated it was cheaper to go to ocean dumping rather than to fix the facility.

Since 1965, Camden has closed down even more of the facility giving almost no treatment to its sewage. The city now dumps the very liquid sludge thence into the ocean. There are no pretenses in the Camden situation. The sludge is raw.

Why should we tolerate that kind of situation?

Dr. BREIDENBACH. We are taking action in Camden and, as I stated earlier, I will supply for the record a detailed account of the Camden situation.

Camden will not be permitted to dump beyond its present permit. Unfortunately, Camden's dumping cannot be terminated overnight. We have to get an alternative, implement it, and then end the ocean dumping.

Mr. SARBANES. You have to lean on them pretty hard.

No one is suggesting you shut it off overnight.

You have given a 5-year period on your permit to Philadelphia, and by your own testimony this morning, which I, of course, question, but even accepting your own testimony, you can see that a 2- to 3-year period is technically feasible.

Is that not correct?

Dr. BREIDENBACH. It is technically feasible to implement an alternative in a two- or three-year period.

Mr. SARBANES. Why do we have the other two years, then?

Dr. BREIDENBACH. There are a lot of considerations that are more than technical.

Mr. SARBANES. What are those?

Dr. BREIDENBACH. The best alternative for Philadelphia has to be selected; land has to be acquired; and architects have to be chosen and contracts bid upon. All this takes time.

Mr. SARBANES. Suppose you do not have that support? What position is EPA going to take? Are you going to extend these time periods?

Dr. BREIDENBACH. No.

Mr. SARBANES. Why do you not force it, then, geared to the best available technical possibility? I do not understand if you take that position, why you have added on 2 to 3 years to the permit period.

Dr. BREIDENBACH. I think you misunderstand me. You asked how long it would take to do the construction necessary to implement the chosen alternative. Given an acceptable alternative, one which the technical people will agree will work at full scale, 2 to 3 years should do it.

I think it is going to take a couple of years to examine the available alternatives to determine which one is acceptable. Parolysis may not be the complete answer for Camden or Philadelphia. It has to be studied in the context of the sludge disposal problems of these localities. What you apparently do not realize is that the planning stage takes time.

Mr. SARBANES. Well, other places are doing it, Dr. Breidenbach.

Dr. BREIDENBACH. Yes.

Mr. SARBANES. And they have been compelled to do it and you keep talking about studies and taking time and all the rest of it. How long is this dumping going to continue?

Dr. BREIDENBACH. It is going to end as we have stated, in 1981. That is the last day.

Mr. SARBANES. Thank you, Mr. Chairman.

Mr. LEGGETT. Thank you, Mr. Sarbanes.

Mr. Bauman?

Mr. BAUMAN. Thank you very much, Mr. Chairman.

Dr. Breidenbach, I want to welcome you before this committee on your maiden voyage.

Dr. BREIDENBACH. Excuse me, but let me add one more answer to the question of Mr. Sarbanes. We are moving with enforcement action at Camden. I did not have the information when I came to the table.

Mr. LEGGETT. Very good.

Mr. BAUMAN. Nevertheless, I do want to welcome you before the committee, Dr. Breidenbach.

Are you familiar with the testimony which this committee heard the other day from Mr. Henry Eschwege, Director of Resources and Economic Development Division of the General Accounting Office?

Dr. BREIDENBACH. I have not read that testimony.

Mr. BAUMAN. You are aware the GAO has been conducting a study of your activities?

Dr. BREIDENBACH. Yes.

Mr. BAUMAN. I would like to ask a few questions based on that testimony which, I think, is an objective view of the operations of your agency.

You have painted a rosy picture in which the number of the ocean dumping permits granted by EPA has been reduced since this act has passed but I read to you from Mr. Eschwege's testimony:

The volume of the sewage sludge and industrial wastes dumped in ocean waters off the coast of the United States increased from 9.2 million tons in 1968, to 10.8 million tons in 1973 and 11.4 million tons in 1974.

Preliminary EPA figures for 1975 show that the volume decreased to 10.4 million tons. More than 98 percent of the 1975 volume was dumped in the Atlantic Ocean.

The GAO report then goes on to project that with the current increasing volume of tonnages which EPA permits on an interim basis, there will be an increase.

How does that square with the picture you are painting of a decreasing threat to the ocean environment?

Dr. BREIDENBACH. You are talking about the Atlantic?

Mr. BAUMAN. I am talking about all sewage sludge and industrial wastes dumped in ocean waters.

These are the figures that the General Accounting Office came up with after investigating your Agency's conduct.

Dr. BREIDENBACH. Because of the increase in sewage sludge in the last couple of years as water treatment methods improve, the total amounts dumped remains high despite our phaseout of permit holders. As I indicated in my testimony, the management of ever-increasing amounts of sludge is a difficult problem. I might add, however, that the dumping of industrial wastes decreased by over 1,100,000 tons in 1975—a 20 percent decrease.

Mr. BAUMAN. Rather than prolong the hearing, maybe you can provide for the record some assessment of whether the GAO figures are correct.

Dr. BREIDENBACH. My figures show 1973, 5.4, 1974, 5.6, 1975, 5.5 for sewage sludge dumped in all ocean waters.

Mr. LEGGETT. 5.5 what?

Dr. BREIDENBACH. That is in millions of tons.

Mr. LEGGETT. 5.5 million tons?

Dr. BREIDENBACH. Right.

Mr. LEGGETT. To go over those again, please, by years——

Dr. BREIDENBACH. I have 1973, 5.4, 1974, 5.6, 1975, 5.5.

Mr. LEGGETT. Well, what do you appear to be doing?

Mr. BAUMAN. Mr. Chairman, will you yield on that point?

Mr. LEGGETT. Well, it is your time.

Mr. BAUMAN. I always defer to my chairman.

The chart which the EPA submitted to us for this committee's consideration, disposals and types and amounts, shows the 1975 year figures of 6,270,000 tons for 1975, which is considerably more than 5.2 million or whatever the figure was that you gave.

Dr. BREIDENBACH. My chart is dated January 24 and we did make a recent update of the 1975 figures. The 1975 sludge total that you have is based upon an estimated figure that was determined by totaling the amounts allowed to be dumped in each outstanding permit. The 5.2 million figure is based upon the sludge which was actually dumped in 1975, subject to some change as all the 1975 fourth quarter totals are received by the regional offices from the permittees.

Mr. BAUMAN. We received this a week ago from your agency.

Mr. LEGGETT. Did you say January 1974?

Dr. BREIDENBACH. No. January 24, 1976.

Mr. BAUMAN. We received these figures a week ago from your Agency. Apparently EPA has mislaid several million tons of sludge.

Dr. BREIDENBACH. We will supply the committee the most recent figures we have on 1975 dumping.

[The information follows:]

# OCEAN DISPOSAL: TYPES AND AMOUNTS, 1975,<sup>1</sup> 1974,<sup>2</sup> AND 1973<sup>3</sup>

[In tons, approximate]

Waste type	Atlantic			Gulf			Pacific			Total		
	1975	1974	1973	1975	1974	1973	1975	1974	1973	1975	1974	1973
Industrial waste.....	3,690,300	4,767,000	3,997,100	123,700	950,000	1,408,000	0	0	0	3,814,000	5,717,000	5,405,100
Sewage sludge.....	5,570,000	5,676,000	5,429,400	0	0	0	0	0	0	5,570,000	5,676,000	5,429,400
Construction and demolition debris.....	749,000	2,242,000	1,161,000	0	0	0	0	0	0	749,000	2,242,000	1,161,000
Solid waste.....	0	0	0	0	0	0	0	200	0	0	200	240
Explosives.....	0	0	0	0	0	0	0	200	240	0	0	0
Total.....	10,009,300	12,685,000	10,587,500	123,700	950,000	1,408,000	0	200	240	10,133,000	13,635,200	11,995,740

<sup>1</sup> 1975 Source—EPA Regional Offices. Preliminary figures from unpublished reports, 1975 (12 mo. of dumping activity).

<sup>2</sup> 1974 Source—EPA Regional Offices. Unpublished reports, updated information, 1974 (12 mo. of dumping activity).

<sup>3</sup> 1973 Source—EPA Regional Offices. Unpublished reports, 1973 (8 mo. of dumping activity, May to December 1973 under permits issued by ocean disposal program extrapolated for 12 mo. to provide an annual rate).

Mr. FORSYTHE. Would the gentleman yield?

Mr. BAUMAN. Yes.

Mr. FORSYTHE. I can see, due to the secondary treatment, that sewage sludge is a growing problem, the fact that you are wiping out permits and not issuing any new ones still does not answer the problem because of this whole situation and your response to my comment on tertiary would exacerbate it.

Dr. BREIDENBACH. That is right.

I would like to emphasize that sewage sludge has increased but the industrial dumping and construction and demolition debris is decreasing.

Mr. BAUMAN. I shall not prolong the argument here, but we will submit these GAO figures to you and I would hope you would provide the committee with some comparisons.

Dr. BREIDENBACH. I would be delighted to do so.

Mr. BAUMAN. Because there is a contradiction.

[The following was received in response to the foregoing:]

#### EXPLANATION OF DISCREPANCIES BETWEEN GAO AND EPA DUMPING STATISTICS

On January 16, 1976, the Ocean Dumping Permit Program prepared a table of preliminary statistics on ocean dumping activity based on information from the Regional offices, before all of the monthly and quarterly reports had been submitted to the Regional offices by the dumpers.

This dated table was submitted as requested both to the Subcommittees and to GAO. Between the time of submitting the material to the Subcommittees, and Dr. Breidenbach's testimony on January 29, 1976, updated dumping information was received from the Regions. With the desire to provide Congress with current dumping statistics, the table was revised on January 22, 1976, to reflect new 1975 statistics. This explains the differences between the two dated EPA tables.

The GAO testimony refers only to the amount of sewage sludge and industrial wastes being dumped off the coasts of the U.S. and does not include the dumping of construction and demolition debris. The EPA Table of January 16, 1976, from which GAO derived the dumping activity for 1973, 1974, and 1975, provides the dumping statistics for all materials, including construction and demolition debris. The updated Table of January 22, 1976, has been provided to GAO as well as to the Subcommittees.

Mr. BAUMAN. You talked about the EPA having established certain levels of toxic materials in sludge that should not be exceeded in EPA's opinion.

Now, I read to you again from the GAO testimony:

The municipal permit holders in New York, northern New Jersey, and the Philadelphia area were dumping sewage sludge containing cadmium or mercury that exceeded from 1 to more than 100 times the safety levels.

This practice is occurring because EPA's regulations allow the dumping of mercury or cadmium in excess of safety levels under certain permits if the materials are present in sewage sludge.

How can EPA establish toxic safety levels and then issue permits that exceed those very same scientific standards?

Dr. BREIDENBACH. In instances where the amounts of toxic pollutants are in excess of the standards, we warn the permittee. The permittee then issued an interim permit in which the permittee, as a condition to continue dumping, is required to meet our standards within a prescribed time frame.

Mr. SARBANES. But you do issue permits which exceed your levels of toxicity as far as that material is concerned?

Dr. BREIDENBACH. Yes, we issue interim permits but under these permits, toxicity standards must be met within a short time or the dumping must cease.

**Mr. BAUMAN.** Interim permits?

**Dr. BREIDENBACH.** Yes, sir.

**Mr. BAUMAN.** I fail to understand how EPA can establish levels of toxic substances and then waive those levels under the guise of an interim permit. That is a sham.

**Mr. BIGLANE.** When EPA issues an interim permit it makes a determination that that is the most environmentally acceptable method for waste disposal at that point. This determination is made by EPA's region office which has explored landbased alternatives for disposal of these wastes.

The issuance of an interim permit does not connote that the discharger will be able to place his waste in the oceans in perpetuity. In the interim permit there is a condition that the discharger must come up with alternative methods of waste disposal.

He is not given a permit in perpetuity.

**Mr. BAUMAN.** Well, I do not want to belabor the point, but I think the record does show, based on your testimony, that you do not deny that sludge 10 to 100 times in excess of EPA's acceptable toxic levels is being dumped into the ocean with EPA approval, even if it is on an interim basis.

**Dr. BREIDENBACH.** I am not sure of the figures you gave, but the interim permits are issued where in the judgment of the regional administrator there is no other environmental alternative.

The question comes down to the question of what will we do with the waste?

**Mr. BAUMAN.** Well, you should understand the difficulty this committee has with your statement. We heard testimony from the Assistant Attorney General of Maryland, who said that in less than 1 year the State of Maryland under court order produced a method of land disposal of sewage sludge that had previously been dumped into the Potomac River. He estimated that based on Maryland's experience, Philadelphia could do the same within 18 months. This could be done as an interim method as you use the term, prior to a final solution as to what the ultimate method ought to be.

This was sewage sludge for the entire Metropolitan Washington area. This area is not too much different in population than that of Philadelphia.

You justify interim permits on the grounds of no available alternate disposal method, but your testimony raises serious question about how forceful EPA is in bringing about the adoption of other alternate methods.

You say that by 1981 there will be an optimum condition with no ocean dumping. I honestly do not believe that and I do not believe that most of the scientists believe that, at least those who are not in the pay of the Environmental Protection Agency.

**Dr. BREIDENBACH.** You cannot take the experience of any city and the time schedule on which they implement alternate methods of disposal and transfer that experience on a 1-to-1 basis to some other city.

Each of our cities has different problems, different populations, different concentrations in their sludge, and transportation analyses. Because city A solved its waste problem in 1 year does not mean that city B can solve its problem in 1 year.

We have to look at each city individually.

Philadelphia has a set of problems. We are pressuring Philadelphia to solve these problems, choose an alternative and implement it by 1981 or before.

Mr. BAUMAN. Just one last question.

Do you have any evidence before your agency that the polio virus which has admittedly been found in certain of the sludge being dumped by Philadelphia is of a strain or nature that would endanger human health?

Dr. BREIDENBACH. Yes, and I would like to comment on that.

Mr. LEGGETT. Not extensively, please.

Dr. BREIDENBACH. It is a very complicated situation, Mr. Chairman.

Mr. LEGGETT. Do you want to provide that for the record?

Mr. BAUMAN. Just give us the bottom line.

Dr. BREIDENBACH. Well, I'm afraid the bottom line is going to be misinterpreted.

Mr. LEGGETT. The bottom line is what?

Dr. BREIDENBACH. Will probably be misinterpreted.

Mr. LEGGETT. Give me the bottom line.

Dr. BREIDENBACH. All right.

In one water sample taken by EPA during a monitoring cruise of the Philadelphia dump site, which was conducted in August of 1974, we found three plaque forming units of polio virus two. The particular sample was taken about 10 miles southwest of the Philadelphia dump site. Fourteen other samples were taken around and in the dump site. No viruses of any sort were contained in these samples.

The finding of polio type two virus is not a rare event. It exists in river water and in sewage sludge.

I am told that the Food and Drug Administration has even found it in certain foods.

This virus is ubiquitous. The reason it is ubiquitous is that we began a massive polio inoculation program many years ago. The polio two virus is excreted by newly vaccinated individuals which has caused the number of polio viruses found in human waste to increase significantly. Anywhere that human waste is discharged into water, it is common that a polio virus two will be found.

The virus used in a vaccine is an attenuated virus. It does not have the capability to seek the nervous tissue and produce the paralytic disease. In contrast, the wild or the virulent virus which produces the disease does seek the nervous tissue.

The test that we used to identify the viruses in water does not distinguish between the wild strain which causes the disease from the vaccine virus.

These three plaque forming units were found and considered to be insignificant in light of the distance they were from shore, the small number found, and the ubiquitousness of polio virus two.

In the first place, they were found about 10 miles southwest of the dump site and south of the Delaware Bay which is 40 miles seaward of the Delaware-Maryland shoreline. As a result, even if the viruses were virulent, the chance of a human coming in contact with one is infinitesimal.

In addition, there is no way to know the source of the polio two virus.

Mr. BAUMAN. It perhaps fell off of a passing ship?

Dr. BREIDENBACH. Yes, it is strong possibility that human waste discharged from a passing ship contained the viruses especially when one considers that the discovery area is in a shipping lane. It also could have come from an ocean outfall or down the Delaware, although both of these possibilities are remote because of the distance involved.

Mr. BAUMAN. Mr. Chairman, I would like to quote Dr. David Sensor of the Communicable Disease Center in Atlanta. He said he did not think the EPA has the virological expertise to determine the presence or degree of polio virus in the sludge. He said the Salk oral vaccine is an attenuated lesser strain and probably could not survive the treatment given Philadelphia's wastes.

Mr. LEGGETT. So we have some conflict whether that is a virus or not.

Mr. BAUMAN. I have an EPA report on this.

Mr. LEGGETT. Was that the EPA report you were reading?

Mr. BAUMAN. No.

Mr. LEGGETT. OK.

That will go in the record.

[The document referred to follows:]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,  
NATIONAL ENVIRONMENTAL RESEARCH CENTER,  
*Cincinnati, Ohio, December 8, 1975.*

Subject: Isolation of Poliovirus at One of the Sampling Stations from "Operation Deep Six," an Ocean Monitoring Cruise in August 1974.

From: A. D. Venosa, Research Microbiologist, Biological Treatment Section, WRD, MERL

To: Dr. Donald Lear, Research Microbiologist, EPA Region III Field Office, Annapolis Science Center, Annapolis, Md.

All pertinent data regarding this positive virus isolation and identification are given below.

1. Sample source: Station No. 9, several meters above the ocean floor.
2. Data sample received by Virology Lab, Cincinnati: August 23, 1974. Sample partially frozen.
3. Date sample assayed: August 28, 1974. After receiving sample on August 23, the sample was immediately stored at  $-70^{\circ}\text{C}$  until August 26, at which time the temperature was raised to  $4^{\circ}\text{C}$  and the sample stored an additional 48 hours prior to primary inoculation on August 28.

4. Sample volume: 1400 ml.

5. Sample pH: 6.65.

6. Results of assay: 3 Plaque Forming Units (PFU) of Poliovirus type 2 were isolated and identified in the 1400 ml sample by Mr. Daniel Dahling.

Since the strain found was Polio type 2, laboratory contamination can be ruled out. The Virology Section only works with Polio type 1 (attenuated) routinely.

Mr. LEGGETT. Now, does the report indicate this is a No. 2 attenuated vaccine-type virus?

Mr. BAUMAN. The interpretation was done by scientists available to the Maryland assistant attorney general. They believe it could very well have been a stronger strain than the Salk virus.

Dr. BREIDENBACH. But the probability of that is very remote. I might also add that EPA has the virological expertise to determine the existence of viruses in sludge.

Mr. BAUMAN. Well, one death would be very remote also.

Mr. LEGGETT. All right.

Could you amplify this for the record and provide a copy to Mr. Bauman and the committee?



**Dr. BREIDENBACH.** We will do that.  
[The information follows:]

#### ENVIRONMENTAL SIGNIFICANCE OF POLIOVIRUS DISCOVERY

The discovery of poliovirus in a water sample taken by EPA employees in a monitoring cruise of the Philadelphia dump site does not pose an imminent threat to human health and further, there is substantial doubt as to whether the source of the virus was sludge dumped in the Philadelphia dump site.

The water sample which contained a small number of poliovirus 2, 8 PFU's of virus to be exact, was one of fifteen samples taken in the course of an EPA monitoring cruise of the Philadelphia dump site. The cruise was conducted from August 12, 1974 through August 15, 1974. While the polioviruses were infectious, all viruses by nature are infectious. The test used to identify the viruses did not distinguish between the attenuated vaccine strain, which is harmless, and the virulent strain, which may be capable of producing paralytic disease. However, in the many years since the introduction of attenuated live-virus polio vaccines in this country, the number of polioviruses found in human sewage has increased greatly because viruses are excreted by newly vaccinated individuals. For this reason, the discovery of poliovirus 2 was not unusual. In fact, anywhere that human waste is discharged into water, it is common that a number of poliovirus 2 will be found.

The health significance of the discovery of the viruses diminishes further when the location of the discovery is considered. The water sample was taken about ten miles southwest of the Philadelphia dump site, a distance of forty miles seaward from the Maryland-Delaware shoreline. Because of the distance from shore, it is improbable that the polioviruses could have reached recreational beaches where bathers could have ingested them. With the minute change of human contact, the health risk imposed by the viruses, even if they were virulent, was equally minute.

Moreover, bathers are exposed to far greater health risks from polioviruses transmitted from other bathers or that exist in land based water pollution sources such as ocean outfalls, than from the 8 PFU's of poliovirus in issue. Even these risks are minimal.

Not only did the polioviruses not present an imminent health hazard, but the source of the viruses cannot be established. While the Philadelphia dump site is the largest source of human waste in the area in which the polioviruses were discovered, other possibilities exist. For example, the area where the polioviruses were discovered is traversed by tankers, fishing vessels and commercial vessels. Human wastes discharged from one such vessel could have contained the small number of polioviruses that were discovered. It also is possible, although unlikely because of the distance involved, that the polioviruses flowed from some source on shore.

Indeed, one factor suggests that the dump site was not the source of the polioviruses. The six samples taken during the August 1974 monitoring cruise from water and sediment within the geographical confines of the dump site contained no viruses. If viruses of any variety including poliovirus 2 were present in any quantity at the dump site, this would have been reflected by these samples.

Until the use of the Philadelphia dump site is discontinued in 1981, the Environmental Protection Agency will continue its monitoring efforts at the dump site to insure that the health and well-being of the citizens of Delaware's and Maryland's coastal communities are not adversely affected.

**Mr. LEGGETT.** Now, what really worries us is, you set these five limitations on dumping and we have done this in California for 20 years with respect to secondary treatment of sludge and the 5 years comes along and the money is not there and another 5 years goes by but we are making some progress because we did get some Federal money, but now that has been cut off.

What we are concerned with is that we do not really see too much progress and generally progress during the 5-year period that gives some indication in reduced tonnage.

What we have here and the figures you provided the counsel for the Pacific there is no problem. For the Gulf we have gone in 1973

from 1 million tons of industrial waste to 950,000 tons in 1974, to 123,000 tons in 1975, and apparently there were seven dumpers down there and they developed alternate bases down there in the great open spaces of Texas, which is obviously a problem to solve in complicated eastern areas.

But if you ignore the Harlem construction dump and what we find that we have gone from, say, 9.5 million tons to 10.2 million tons, in a progressive fashion, from 1973 to 1975, of dumping of industrial waste and sludge waste essentially from the two sides of New York and Philadelphia, and if you extrapolate it that does not look very good.

So, necessarily then, you have to believe in miracle cures.

What we want to know is, what is the program in 1981, but what do you anticipate the benchmarks are going to be for 1977, 1978, 1979, and 1980?

If you can show to us the program, what it looks like, a phased reduction, but the objective will not be accomplished until 1981, I think we will be much more impressed with the oversight of the program.

Dr. BREIDENBACH. Let us try to develop that for you and put it into the record.

[The information follows:]

#### PROJECTED TONNAGE FIGURES FOR OCEAN DUMPING THROUGH 1980

A projection of dumping activity in the U.S. in the next 5 years would have to be based on current dumping statistics with the understanding that such estimates are subject to change. Each of the Regional offices has set a goal of phasing out ocean dumping by 1981. All of the permittees who will be dumping in the next five years are required by the Regions to develop alternatives to ocean dumping and to implement them by or before 1981.

The following is a projection of the amount of ocean dumping of wastes, other than dredged materials, in wet tons for each of the next five years:

1976—10.3 million tons.  
1977—11.6 million tons.  
1978—12.3 million tons.  
1979—12.0 million tons.  
1980—13.0 million tons.

Mr. LEGGETT. And you let the various agencies know that your Agency is right under the gun and because we are under the gun, because the people from Maryland, you know, would just as well rise up in arms and strike and fail to pay their taxes and such as that because, well, some people do not want pay to get rid of this, but there are a lot of people who do not want to suffer the consequences of it anymore in light of the Federal law.

I recognize your problem, that you do have a social political issue to balance, and it is not exactly easy.

Mr. Spensley, do you have some questions?

Mr. SPENSLEY. I just want to follow up on some of the questioning by Mr. Bauman, with respect to the criteria for dumping.

As I understand, the criteria refers to concentrations of materials such as mercury and so on that can be dumped.

Would it be possible for a dumper to put an unlimited amount of mercury in the marine environment simply by diluting it?

Dr. BREIDENBACH. It would.

I think it would be hardly cost effective because he would have to add a tremendous amount of fluid and that would increase the weight and decrease the amount he could take and the cost of hauling it would remain constant.

I do not believe that is the kind of thing that could be tried successfully.

Mr. SPENSLEY. In other words, the answer is yes, but it is not cost effective?

Dr. BREIDENBACH. Yes, and with the Coast Guard monitoring mercury toxics, they would be looking closely at this situation.

Mr. SPENSLEY. Evidently it has been suggested in other hearings on this matter that there are wastes that do not contain the materials prohibited by the criteria and these wastes would pose a significant adverse impact in our ecosystems.

It seemed to imply that evidently that testimony did indicate that in those cases, wastes are not controlled by EPA under the Ocean Dumping Act, which I was about to say, is a regulatory posture by EPA, and appears to be contrary to the Ocean Dumping Act in that such dumping, the act requires that such dumping will not unreasonably endanger, degrade, or interfere with the amenities of the human environment.

I think, also, the policy of the United States is to prevent or strictly limit dumping of any material that would adversely affect the health and welfare.

Would you want to comment on that?

Dr. BREIDENBACH. Well, I am completely unaware of any materials that are being dumped which are not covered by the criteria.

If there are such materials and if that is in that testimony, we certainly better look into it, but your remark comes as a surprise.

Mr. SPENSLEY. That is your colleagues' understanding as well.

Mr. LEGGETT. Very good.

Mr. Forsythe?

Mr. FORSYTHE. Mr. Chairman, I believe Mr. Perian has a question.

Mr. PERIAN. Congressman Murphy would like to know if you can explain what EPA's plans are with regard to dumping in the New York Bight?

Are you going to phase it out or simply move the dump site?

Mr. LEGGETT. You want to provide a very quick and accurate response for the record?

Dr. BREIDENBACH. I think that would be better.

Mr. PERIAN. Thank you.

[The information follows:]

#### EPA'S PLANS WITH REGARD TO THE NEW YORK BIGHT

Assessment of future needs and problems associated with the handling of municipal sludges in the New York-New Jersey Metropolitan area indicated that the construction of new and improved wastewater treatment facilities under P.L. 92-500 would increase by two-to three-fold the amount of sludge requiring ocean dumping. EPA, along with the National Oceanic and Atmospheric Administration (NOAA) recognized the potential environmental impact associated with dumping increased volumes of sludge at the existing sewage sludge dump site; particularly, the potential adverse effect on water quality along the bathing beaches of New Jersey and Long Island. Thus, in late 1973, initial contacts were made with NOAA on designation of an alternate dump site which could

be used pending development and implementation of land-based alternative methods. Two "on-the-shelf" areas were identified by NOAA in March 1974 for consideration. Studies were initiated by NOAA to collect baseline data needed to assess the environmental aspects of ocean dumping in these two areas. In December 1974, EPA contracted a consulting firm (Dames & Moore) to prepare an Environmental Impact Statement (EIS) regarding the designation of a new dump site within these two areas. Potential environmental impact, economics, and social considerations will be addressed in this EIS. Also, an alternative action of continued use of the existing site, in lieu of moving to a new location, will be considered. The EIS will, therefore, evaluate the trade-offs of continued use of an already adversely affected area and the potential environmental damage at a new location. No decision will be made until after a Draft EIS has been completed, public hearings held, and the Final EIS issued. Present schedule indicates that the Draft EIS will be completed in late February 1976, public hearings will be held in New York City, southern New Jersey and on Long Island during the last week in March and the Final EIS issued in July 1976.

Even if the sewage sludge dump site is relocated, Region II's intent to phase out ocean dumping when acceptable alternatives are developed and implemented will continue.

Mr. LEGGETT. Mr. Mannina?

Mr. MANNINA. Dr. Breidenbach, a quick question.

According to information you supplied to us in 1975, region 2 processed the 75 permit applications and region 3 processed 7, yet region 2 only has 7 dumping personnel and region 3 had 6.

Can you explain the distribution of personnel considering the workload?

Dr. BREIDENBACH. I will have to turn to my colleague.

Mr. WASTLER. The figures you have do not identify people dedicated completely to the ocean dumping permit program.

It is a man's year of effort in each region.

Mr. MANNINA. The chart says positions.

That is inaccurate?

Mr. WASTLER. It is man years of effort.

Mr. MANNINA. Thank you, that clarifies it. One last question: With respect to the dumping of liquid wastes the committee received testimony implying it was entirely feasible that these materials could remain in the water column and be spread by the currents over reasonably large geographical areas, thus endangering marine life and perhaps commercial fisheries.

Have you done any tests to determine whether these liquefied wastes indeed remain in the water column to be spread by currents?

Mr. WASTLER. One of the large problems in the ocean dumping business is when you dump a liquid waste, it disperses fairly rapidly.

You can follow it for a few hours, perhaps, in some cases a few days, so that you can detect what amounts to acute effects, but you have a great deal of trouble determining the chronic effects simply because the concentrations get down below what you can detect, even though you know they are there and they are probably having some long-range effect.

Mr. MANNINA. In other words, in your estimation, there is a reasonable possibility that fisheries could be damaged by these liquefied wastes but you have no way of determining that.

Mr. WASTLER. We have under development at the present time on a research basis a device which has shown in its first test some promise for being able to do that. This is something that we call a biotal ocean monitor.

This consists of and is an oversized plankton net, essentially, that can be moored at a dump site and you can introduce certain biota into it—fish, crustaceans, plankton, even—and come back and sample them from time to time, sort of an in site bioassay device.

We are planning on continuing field testing this in the Gulf of Mexico and hopefully getting it started and in use up the New York Bight and Philadelphia areas during this time of year.

Mr. MANNINA. The development of a test begs the question of the dumping of liquid waste.

If you can incinerate herbicide orange, the essential component of which 2,4,5-T is one of the most toxic substances known to man, and be 99 percent effective, why can you not incinerate this liquid acid waste?

Mr. WASTLER. The materials that are considered for ocean incineration is 100 percent organic chloride waste containing no trace of metal, even though it may contain highly toxic organic materials such as dioxin.

These are essentially completely destroyed in the incineration process and there is no residue.

You wind up with hydrochloric acid, hydrocarbon oxide and water. That is the incineration part of it.

When you try to incinerate acid and things like that, these inorganic—you end up with a sludge, a residue of some sort and salt, which contains materials nonamenable to the incineration process.

Mr. MANNINA. Are you working on developing such a process for these materials such as would be feasible?

Dr. BREIDENBACH. We are working on encouraging development methods of disposing of acids.

Mr. MANNINA. Are you working on developing the process now?

Dr. BREIDENBACH. Last I knew of it, we were in the Industrial Research Laboratory in Cincinnati.

Mr. MANNINA. But are you working on it at the present time?

Dr. BREIDENBACH. I cannot answer that.

We were at the time I left 6 months ago.

Mr. MANNINA. Could you supply for the record?

Dr. BREIDENBACH. Yes.

Mr. MANNINA. Thank you.

[The information follows:]

#### **EPA RESEARCH ACTIVITIES IN DEVELOPING METHODS OF DISPOSING OF ACIDS**

Some of the environmental research conducted by EPA, primarily out of the Industrial Environmental Laboratory in Cincinnati, Ohio, involves the treatment, reclamation, and eventual disposal of acid wastes from industrial processes. During Fiscal Years 1970-1976, EPA has participated in research projects costing over \$5.5 million, of which EPA has provided approximately \$1.5 million.

Some of the projects include the following:

1. E. I. du Pont de Nemours and Company—technical and economic aspects of the dispersal of acid-iron industrial waste at sea.
2. Southern Research Institute—to assess the pollution-control problems of the Paint and Pigment Industries.
3. The New Jersey Zinc Company—a pilot study of the recovery of sulfuric acid from the waste acid stream generated during production of titanium dioxide pigment by the sulfate process.

4. Crown Chemical Company, Inc.—a closed-loop recycle system for conversion of ferrous sulfate from spent pickle liquor to iron oxide and reusable sulfuric acid.

5. Volco Brass & Copper Co.—an electrolytic system to recover copper and to regenerate sulfuric acid for reuse.

6. Armco Steel Corp.—limestone treatment of rinse waters from hydrochloric acid pickling of steel.

7. Alabama Water Improvement Commission—electromembrane process for regenerating acid from spent sulfuric acid pickle liquor.

8. The Fitzsimons Steel Co., Inc.—recovery of sulfuric acid and ferrous sulfate from waste pickle liquor.

9. Toledo Pickling & Steel Services, Inc.—regeneration of hydrochloric acid waste pickle liquor.

10. University of Alabama—precipitation of iron from acidic process liquors.

11. Douglas & Lomason Corp.—feasibility study for phosphoric acid recovery system.

12. Douglas & Lomason Corp.—installation of prototype system for phosphoric acid recovery system.

Mr. LEGGETT. I wish we could get the zealotness in research in EPA that we do in the Department of Defense.

I have just left the Defense Committee and we have a growth over there in the procurement accounts alone in the Department of Defense of \$4 billion.

Now, EPA in title I was authorized and you supported this authorization and you said you needed \$3.6 million in 1973 and the appropriation request was \$290,000.

In 1974 it was \$5.5 million and the appropriation request was \$1.276 million.

In 1975 it was \$5.5 million and the appropriation request was \$1.229 million.

In 1976, this year, it was \$5.3 million you said you needed and it turned out to be \$1.131 million.

For 1977, the budget that has just gone in, it was \$1.3 million and, of course, the Chairman and myself and some others have put in a bill to authorize \$5.3 million plus.

Now, you present a paper to this committee indicating you have to conduct a lot of surveys that cost on the order of \$200,000 per survey.

You state you do not have the people to do it.

Does anybody come apart at the seams down there and claim that the health and welfare of the people of the United States may not be worth saving with all of these intercontinental ballistic missiles unless we do something with these programs one of these years?

I know you have indicated you do not know whether the acid program is going on or not. But it seems to me we have to get excited and stand up on our chairs and raise hell.

Dr. BREIDENBACH. I do not know if we have come apart at the seams down there or not but there are very vigorous discussions on the relative priorities and the things that we have to be doing.

Mr. LEGGETT. Who do you submit your requests to, directly to the Office of Management and Budget?

Dr. BREIDENBACH. Our budget requests must go through OMB.

Mr. LEGGETT. Let me in on your secret.

How much did you request of OMB for fiscal year 1977?

Dr. BREIDENBACH. I do not have that information with me.

Mr. LEGGETT. I would think that you would know that figure and that you would be highly upset that your budget was emasculated.

We just had information on NOAA that they operate off of a budget excluding payroll of about \$65 million; that they thought they needed \$37 million, the monumental amount of \$37 million, and that amounts to about one and one-half F-15 airplanes to make that realistic, and that went to NOAA for the Marine Fisheries Service, and they generally approved it.

It then went to Commerce and they gave them about three-quarters of it, and then it went to OMB from Commerce and I guess with about half of it, and OMB, rather than giving them some 100-plus personnel and \$37 million, they gave them two personnel and \$2 million.

I would suspect that your budget has been similarly treated, and you should certainly know these figures, or in the course of reasonable diligence should have them generally on the tips of your fingers and ought to be able to communicate them without revealing any internal secrets of your department to this committee.

I realize that you have been on the job just so long.

How many months did you say?

Dr. BREIDENBACH. Officially, since December 15.

Mr. LEGGETT. All right, I can excuse you, then, but certainly we want this information back to this committee just as soon as you can get it here.

I think it is very important that we know, you know, whether or not the fault lies with you or with OMB in balancing the various priorities.

Dr. BREIDENBACH. We shall respond.

[The information was submitted:]

The budget figure for FY 77 submitted by EPA to OMB and approved by OMB for its ocean dumping program is \$1.319 million. However, EPA with OMB approval has requested authorization for FY 77 of \$4.8 million.

A BILL To extend the Marine Protection, Research, and Sanctuaries Act for two years.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section 111 of the Marine Protection, Research, and Sanctuaries Act (33 U.S.C. 1420) is amended by striking "and not to exceed \$1,550,000 for the transition period (July 1, through September 30, 1976)," and inserting in lieu thereof "not to exceed \$1,550,000 for the transition period (July 1, through September 30, 1976), not to exceed \$4,800,000 for fiscal year 1977, and not to exceed \$4,800,000 for fiscal year 1978."

Mr. LEGGETT. Mr. Everett?

Mr. EVERETT. I do not know whether you were asked or not, but we have gotten this from other agencies, but we would like to know if the Office of Ocean Dumping requested of EPA to submit to OMB for fiscal 1977, and also the justifications for the programs that they want to carry out in fiscal 1977.

Dr. BREIDENBACH. All right.

[The following was received for inclusion in the record:]

### BUDGET REQUEST BY OFFICE OF OCEAN DUMPING

#### AT PRESENT LEVEL OF FUNDING (\$1.319M)

	Fiscal year 76	Fiscal year 77	Fiscal year 78
Subtotal monitoring.....	75,000	65,000	190,000
Subtotal special studies.....	318,000	125,000	-----
Subtotal dump site surveys.....	592,000	529,000	529,000
Personnel costs.....	736,000	600,000	600,000
Total.....	<sup>1</sup> 1,721,000	1,319,000	1,319,000

<sup>1</sup> Includes transition quarter.

#### AT INCREASED LEVEL OF FUNDING (\$4.8M)

	Fiscal year 76	Fiscal year 77	Fiscal year 78
Subtotal monitoring.....	75,000	200,000	1,000,000
Subtotal special studies.....	318,000	1,000,000	1,000,000
Subtotal dump site surveys.....	592,000	2,800,000	2,000,000
Personnel costs.....	736,000	800,000	800,000
Total.....	<sup>1</sup> 1,721,000	4,800,000	4,800,000

<sup>1</sup> Includes transition quarter.



Ocean dump site designation and monitoring			At present level of funding (1.319—)		
Dump site	Accomplished to date	Remains to be done	Fiscal year 1976	Fiscal year 1977	Fiscal year 1978
New York sludge site.....	3 surveys completed (contract) \$700,000.	Quality control studies.....	Quality Control studies—Env. Assess. \$200,000.	EIS/site monitoring \$65,000.....	Site monitoring \$100,000.
New York Acid site.....	None.....	4 surveys.....			
New York "Cellar Dirt" Site.....	do.....	2 surveys.....			
106 Site.....	2 surveys completed (NOAA Research).	3 surveys (NOAA).....	1 survey (IAG/NOAA) \$207,000.	1 survey (IAG/NOAA) \$229,000.	1 survey (IAG/NOAA) \$229,000.
Philadelphia sludge site.....	8 surveys completed + 5 special surveys completed (EPA) \$860,000.	2 surveys + monitoring studies (contract).	Monitoring studies \$75,000.....	1 survey \$150,000.....	1 survey \$150,000 EIS/ Site monitoring \$90,000.
DuPont site.....	8 surveys completed + 5 special surveys completed (EPA) combined with Philadelphia site surveys.	do.....	Monitoring studies (funds under Philadelphia site).	1 survey (funds under Philadelphia site).	1 survey (funds under Philadelphia site).
Puerto Rico site.....	None.....	3 surveys.....			
Galveston site.....	do.....	3 surveys (NOAA).....	1 survey (IAG/NOAA) \$150,000 <sup>1</sup> .	1 survey (IAG/NOAA) \$150,000.	1 survey (IAG/NOAA) \$150,000.
Mississippi River site.....	do.....	3 surveys.....			
North Atlantic incineration site.....	do.....	2 surveys.....			
South Atlantic incineration site.....	do.....	do.....			
North Pacific incineration site.....	do.....	do.....			
South Pacific incineration site.....	do.....	do.....			
Mid-Pacific incineration site.....	do.....	do.....			
Gulf incineration site.....	4 surveys completed; 2 EPA, 1 contract, 1 by Shell Chemical.		EIS \$35,000.....		
Special studies	Accomplished to date	Remains to be done	Fiscal year 1976	Fiscal year 1977	Fiscal year 1978
Biotol Ocean Monitor System Development.	2 sizes of prototypes designed and tested at sea.	Benthic model design and test; develop biological test procedures.	75,000.....	50,000.....	
Sludge dispersion at dump sites.....	None.....	Feasibility study of quantitative measurement using aircraft.	58,000.....		
Current meter quality control.....	do.....	Field comparison of current meters.	75,000 and 40,000 <sup>1</sup> .....		
O.D. Alternatives Island building facility Salt Dome storage feasibility Ocean Platform incineration feasibility.	do.....	Identification of potential alternatives; feasibility studies.	70,000 <sup>1</sup> .....	75,000.....	

<sup>1</sup> Fiscal year 1976 transition funds.

Ocean dump site designation and monitoring			At increased level of funding (\$4.8M)		
Dump sites	Accomplished to date	Remains to be done	Fiscal year 1976	Fiscal year 1977	Fiscal year 1978
New York sludge site.....	3 surveys completed (contract) \$700,000.	Quality control studies.....	Quality Control Studies—Env. Assess. \$200,000.	EIS/site monitoring \$100,000....	Site monitoring \$200,000.
New York acid site.....	None.....	4 surveys.....		4 surveys \$1,000,000.....	EIS/site monitoring \$200,000.
New York "Cellar Dirt" site.....	do.....	2 surveys.....		2 surveys (funds under New York acid site).	EIS/site monitoring (funds under New York acid site).
106 site.....	2 surveys completed (NOAA research).	3 surveys (NOAA).....	1 survey (IAG/NOAA) \$207,000....	1 survey (IAG/NOAA) \$200,000....	1 survey (IAG/NOAA) \$200,000.
Philadelphia sludge site.....	8 surveys completed + 5 special surveys completed (EPA) \$860,000.	2 surveys + monitoring studies (contract).	Monitoring studies \$75,000.....	2 surveys \$500,000.....	EIS site monitoring \$200,000.
DuPont site.....	8 surveys completed + 5 special surveys completed (EPA) combined with Philadelphia site surveys.	do.....	Monitoring studies (funds under Philadelphia site).	2 surveys (funds under Philadelphia site).	EIS/site monitoring (funds under Philadelphia site).
Puerto Rico site.....	None.....	3 surveys.....		2 surveys (IAG/NOAA) \$400,000....	1 survey (IAG-NOAA) \$200,000.
Galveston site.....	do.....	3 surveys (NOAA).....	1 survey (IAG/NOAA) \$150,000 <sup>1</sup> ....	2 surveys (IAG/NOAA) \$500,000....	EIS/site monitoring \$200,000.
Mississippi River site.....	do.....	3 surveys.....			3 surveys \$700,000.
North Atlantic incineration site.....	do.....	2 surveys.....		2 surveys \$200,000.....	EIS/site monitoring \$100,000.
South Atlantic incineration site.....	do.....	do.....			2 surveys \$300,000.
North Pacific incineration site.....	do.....	do.....			Do.
South Pacific incineration site.....	do.....	do.....			Do.
Mid-Pacific incineration site.....	do.....	do.....			
Gulf incineration site.....	4 surveys completed; 2 EPA, 1 contract, 1 by Shell Chemical.		EIS \$35,000.....	Site monitoring \$100,000.....	Site monitoring \$100,000.
Special studies	Accomplished to date	Remains to be done	Fiscal year 1976	Fiscal year 1977	Fiscal year 1978
Biotol Ocean monitor system development.	2 sizes of prototypes designed and tested at sea.	Benthic model design and test; develop biological test procedures.	75,000.....	100,000.....	
Sludge dispersion at dump sites.....	None.....	Feasibility study of quantitative measurement using aircraft.	58,000.....		
Current meter quality control.....	do.....	Field comparison of current meters.	75,000 and 40,000 <sup>1</sup> .....		
O.D. alternatives Island Building facility Salt Dome storage feasibility Ocean platform incineration feasibility.	do.....	Identification of potential alternatives; feasibility studies.	70,000 <sup>1</sup> .....	900,000.....	1,000,000.

Mr. LEGGETT. That would be the reasons, obviously, you requested more money than this, because you do not even keep up with inflation and we are being inundated with sludge and we have got to figure out how to do it, the cities and States and counties have to do it, so you obviously submitted what you considered to be an adequate budget, and you provided a justification, and we want that information.

What we would like to do, very frankly, is to go to the Appropriations Committee with all of the items that are subject to the jurisdiction of this committee and to try to seek to justify the original items that were submitted so we can balance in some way these amounts.

Dr. BREIDENBACH. We will provide the information.

[The information follows:]

RESPONSES TO QUESTIONS BY CONGRESSMAN EDWIN B. FORSYTHE ON OCEAN DUMPING

*Question 1.* Since the inception of the ocean dumping program, have any areas affected by ocean disposal been closed to commercial fishing or shellfishing due to pollution resulting from the dumping?

Answer. There have been no closures of commercial fishing or shellfishing areas reported to EPA since the beginning of the ocean dumping permit program due to pollution resulting from dumping activities.

*Question 2.* During the course of environmental site surveys, has EPA detected any movement of wastes from the dump site caused by natural factors?

Answer. There are basically two types of ocean dump sites—containment sites and dispersal sites. The Region II sewage sludge site in the New York Bight is primarily a containment site and no movement of sludge from the dump site has been detected since the inception of the permit program.

The dump sites in Region III for waste acid and sewage sludge are semi-dispersal sites. If a dispersal site is used for ocean dumping then there would be, by definition, movement of the wastes outside the dump site. However, the location and size of the site, as well as the conditions of dumping, are selected to assure that mixing of the wastes and dilution to background level are achieved within the mixing zone.

*Question 3.* At those sites where liquid wastes are being disposed, how do the agencies monitor the spread of that material as it mixes with currents?

Answer. The dispersion of liquid wastes dumped in ocean waters is monitored both by water samples collected in the wake of the barges and by sampling in the water column. The liquid wastes disperse so rapidly due to the action of ocean currents that this monitoring is regarded as scientifically useful or economically feasible only in a few cases. We are in the final stages of negotiating a contract to improve our capabilities to monitor such dispersion of liquid wastes.

*Question 4.* With respect to the ocean dumping research program, what are EPA's priorities?

Answer. The ocean dumping research which has highest priority is research related to the ecological fate and effects of ocean disposed materials. The information derived from these studies is essential to the evaluation of ocean dumping permit applications and to revising the ocean dumping criteria.

The major effort under fate and effects research examines the ecological perturbations caused by the ocean disposal of sewage sludge. Research information dealing with the impact on the marine environment of dumping Philadelphia's sewage sludge was presented at the EPA hearing on Philadelphia's ocean dumping permit application. The research information was considered in the EPA Administrator's decision to phase out the dumping of this sludge and develop land based alternatives.

Emphasis is presently being given to ecological research on the fate and effects of dredged material disposal. The EPA and the US Army Corps of Engineers (COE) have established an EPA/COE committee to coordinate dredge material ecological research. This committee will prevent duplication in our research programs and insure that the latest research information is incorporated into revisions of the dredge spoil ocean disposal criteria and dredge spoil disposal guidelines.

The development of bioassay procedures is also considered to have high priority. Bioassay procedures are used in the ocean dumping permit program to evaluate the ecological effects of materials to be ocean disposed.

**Question 5.** EPA, NOAA, and the Corps all have ocean dumping research responsibilities pursuant to the Marine Protection, Research, and Sanctuaries Act and other statutes. How are the efforts of these three agencies coordinated in order to prevent unnecessary duplication?

**Answer.** The ocean dumping research conducted at each of three EPA marine laboratories—Narragansett, Rhode Island; Corvallis, Oregon; and Gulf Breeze, Florida; is coordinated with the elements of NOAA involved in ocean dumping research. The coordination is done at the working scientists level in order to provide the most comprehensive exchange of information. Specifically, most of the activities deal with research off the Atlantic Coast in evaluating dump sites in the New York Bight and offshore Delaware.

A Research Coordinating Committee has been established between EPA's Office of Research and Development and the Corps of Engineers' Waterways Experiment Station in Vicksburg, Mississippi. This group not only coordinates research, but also develops new information for revisions to the dredged material disposal guidelines for Section 404 of PL 92-500 and revisions to the Ocean Dumping Criteria.

In addition, the Interagency Coordinating Committee for Ocean Dumping with representatives of EPA, NOAA, Corps of Engineers, and the Coast Guard reviews progress on the regulatory activities, surveillance of dumping activities, and dump site surveys and also cooperates on revisions to the ocean dumping regulations.

**Question 6.** Section 106(d) permits States to propose ocean dumping criteria for ocean waters within their jurisdiction. If EPA finds that the proposed criteria are not inconsistent with the established Federal criteria, EPA shall adopt and implement the states' recommendations. To date, have any states proposed such criteria to EPA and, if so what has been the disposition of the states' recommendations?

**Answer.** To date, no state has proposed criteria relating to the dumping of materials in ocean waters within their jurisdiction.

**Question 7.** Pursuant to Section 107(b), the Administrator or the Secretary may delegate to the heads of other Federal departments or agencies the responsibility for reviewing and approving permit applications. Has EPA delegated such responsibility to any Federal agency or department?

**Answer.** EPA has not delegated any responsibility for reviewing and evaluating permit applications to any Federal agency or department.

**Question 8.** Are any of the monies included in EPA's budget request to be utilized for reimbursing other agencies for ocean dumping activities?

**Answer.** Several Interagency Agreements have been negotiated with Federal agencies to reimburse the other agencies out of the EPA budget request for their ocean dumping activities, primarily dump site survey work.

**Question 9.** The Act authorizes the Administrator to establish fees to cover some of the costs of processing permits. What fee schedule has been established?

**Answer.** The fee schedule for processing permit applications is incorporated in the Ocean Dumping Regulations, specifically at 40 CFR 221.5, and provides for:

(a) A fee of \$1000 for each application for dumping in an existing dump site;

(b) An additional fee of \$3000 for an application involving the use of a site other than a designated dump site;

(c) A fee of \$700 for each application for renewal of a permit; and

(d) A waiver of the fees for U.S. Federal, State or local governments.

**Question 10.** With respect to the filing of Environmental Impact Statements, has EPA filed a programmatic (sic) statement or is an individual statement done whenever a new dumping site is designated or do the agencies prepare in (sic) impact statement prior to considering each individual permit application?

**Answer.** On October 15, 1974, in his statement that voluntary Environmental Impact Statements would be prepared on certain regulatory actions of the Agency, Administrator Train specified two parts of the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 (the Ocean Dumping Act) which would be subject to EIS preparation. These were designation of ocean dumping sites and any major revisions to the Ocean Dumping Final Regulations and Criteria. Ocean dumping permits were not included.

In the adjudicatory hearing granted to the City of Philadelphia regarding their ocean dumping permit, the State of Maryland protested that the permit should not be issued until EPA had prepared an EIS. In his recommendation to the Administrator, the Panel Chairman stated "The factors set forth in Section 102 of the MPRSA and 40 CFR 220-227 require an extensive analysis of the environmental effects and alternatives, providing ample illumination and consideration of these elements of the decision; that is the purpose behind the National Environmental Policy Act (NEPA)." The panel further found that the procedures followed by the Agency in the issuance of ocean dumping permits does provide the functional equivalent of an EIS and that no further action should be required.

**Question 11.** Representatives of the General Accounting Office indicated to the Committee that barges upon arrival at the dump site are generally dumping wastes at too rapid a rate which may be causing harm to the environment. Would you please comment on that?

**Answer.** Monitoring and surveillance of dumping activities permitted under the Act are the responsibility of the U.S. Coast Guard; therefore, the determination that dumpers are discharging at too rapid a rate would be made by the Coast Guard. To date, EPA has received no Coast Guard referrals pertaining to such permit violations. The General Accounting Office has not reported any specific violations of discharge rate as a permit condition. When EPA receives reports of such alleged violations of permit conditions, action will be taken.

**Question 12.** Would you please indicate for each dump site the average time taken by a disposal barge to empty its waste? Could you also indicate for each dump site the average number of barges present during the course of a 24-hour period?

**Answer.**

*Region I—Dump Site Industrial Waste Site—2 hrs.*

*Region II—Dump Site: N.Y. Acid Waste Site; N.Y. Sewage Sludge Site; N.Y. Wreck Site; N.Y. Mud Site; N.Y. Cellar Dirt Site—Less than one hour based on recommendations by the U.S.C.G. in order to reduce potential navigational hazards. (These dump sites are located in or adjacent to navigational lanes to and from the New York Harbor.)*

*Chemical Wastes Site, New York Bight—One to ten hours.*

*Chemical Wastes Site, Puerto Rico—Six to ten hours.*

One Special permit has been issued to Crompton & Knowles Corporation for use of the chemical wastes site in the New York Bight with a discharge rate of 6,000 gallons per nautical mile. Thus, the time of discharge is proportional to the amount of waste being carried by the discharging barge.

*Region III—Dump Site:*

*DuPont Acid Waste Site—4.5 hrs.*

*Sewage Sludge Site, Camden—1.2 hrs.*

*Philadelphia—1.5-4 hrs.*

*Region VI—Dump Site:*

*Galveston Site—7-12 hrs.*

*Mississippi River Site—2.5-5 hrs.*

Surveillance of the barging activity at the dump sites is the responsibility of the Coast Guard. The average number of barges present at a dump site would best be obtained from the Coast Guard.

**Question 13.** To prevent short-term harm to the environment, and to establish the rate at which wastes can be dumped, EPA utilizes bioassay tests in which brine shrimp are the test species. GAO criticized the use of brine shrimp because: 1) it is not a marine organism; 2) it is too hearty (sic); and 3) most marine plants and animals would be dead before the brine shrimp showed any harmful effects. If GAO's findings are accurate, isn't the validity of many EPA permit regulations and conditions suspect? Further, why isn't EPA using an appropriate marine organism for the bioassay test?

**Answer.** As an expedient to immediately fulfill the bioassay requirement in implementation of the ocean dumping program, a test organism was required which:

- (1) Had a long-term history of scientific and laboratory use.
- (2) Was adaptable to rapid bioassay tests, using either early life history or adult stages.
- (3) Was available on a year-round basis.
- (4) Was representative of some form of salt water environment.
- (5) Could be used by laboratories and personnel of diverse technical expertise to produce data for inter-comparison of tests results.

The brine shrimp (*Artemia salina*) immediately met these criteria. The use of brine shrimp as a bioassay organism represented a first step in the development of bioassay tests for ocean dumping material analysis. Scientifically, bioassays often use organisms, or tissues, which have scientific precedence in laboratory testing, and can yield reproducible results for scientific and statistical analysis. In the specific case of brine shrimp use in bioassays, these organisms are available on a year-round basis and have previously revealed useful information and insight into the effects of petroleum components, chlorinated hydrocarbons, and the transfer of pesticides to both larval blue crabs and fishes. Therefore, it was appropriate to apply brine shrimp as a static bioassay screening organism during the initial phases of the development of appropriate bioassay procedures for complex wastes involved in sewage sludges. This is analogous to screening potentially harmful drugs or chemicals with tests using white mice to determine potential human health effects. The brine shrimp was never proposed or intended to be accepted as either a final choice or as a representative organism for ocean dump sites. The intention was that other organisms would replace *Artemia* as methodologies were developed. At the present time, *Artemia* as well as other organisms is recommended for use.

At the present time, EPA is developing a bioassay methods manual which recommends a selection of other marine organisms including phytoplankton (algae), zooplankton (copepods), molluscs (clams, oysters), crustacea (shrimp), and fishes. As the scientific state of the art advances it is anticipated that the use of additional species and mixtures of species to represent specific dump site ecologies will be proposed.

It is appropriate to note that the EPA bioassay working group recommends using species appropriate for mid-water or the bottom (or benthic zone) depending upon the waste to be dumped. Sludge requires both benthic and mid-water species. Dredged materials, normally, would need more emphasis on benthic forms.

The bioassay methods manual draft has been in the hands of regional users for field testing. It is my understanding that, in addition to brine shrimp reference tests, bioassays involving fishes and other organisms have been routinely used in EPA regions for a year or more.

**Question 14.** On January 5, 1976, EPA's General Counsel issued a memorandum to all EPA coastal Regional Offices calling their attention to "the revelation that there may be ocean disposal sites which are in use and which may have been designated under laws no longer valid." Each Region was requested to investigate this matter. Could you tell the Committee what the results of that investigation were?

**Answer.** The investigation requested by EPA's General Counsel was concerned only with sites for the disposal of dredged material under permits from the Corps of Engineers. The Act does not require that the Corps must issue permits only for the use of EPA-designated sites, but it does require that EPA concur in the use of whatever site is used. The results of this investigation so far have shown that all dredged material sites are either EPA-designated or are being used by Corps permittees with the concurrence of EPA.

**Question 15.** EPA Region III has all of its sludge dumpers on phase-out schedules of five years or less. Region II has yet to specify a termination date for any of its sludge dumpers. Could you explain this difference and indicate if Mr. Train's September 25, 1975, decision to phase out sludge dumping by Philadelphia is relevant to Region II?

**Answer.** EPA Region II, has administered its ocean dumping program from its inception with the stated intent to phase out ocean dumping of municipal and industrial wastes by 1981, provided environmentally acceptable, technically feasible, and economically reasonable alternatives could be developed and implemented. For example, in August 1974, Mr. Richard T. Dewling, former Director of Region II's Surveillance & Analysis Division, in testimony before the U.S. Senate Subcommittee on Environmental Pollution, made the following statements regarding the development of alternative methods for the disposal of sewage sludges:

"EPA funded a two year, \$200,000 study with the Interstate Sanitation Commission to look at these (incineration, controlled ocean disposal, landfilling, soil conditioner or fertilizer) and other alternatives and to recommend, by June 1976, the acceptable alternative to resolving this (sewage sludge disposal) problem."

"We have developed and implemented a plan—with the ultimate goal of phasing out ocean disposal by 1981 . . ."

Region II has made significant progress toward phase out of industrial waste generators and is actively pursuing alternate disposal methods for municipal waste. Mr. Gerald M. Hansler, P.E., Regional Administrator, will elaborate on this program during his testimony before the Subcommittee on March 5, 1976.

**Question 16.** It is my understanding that EPA has made several suggestions to the Coast Guard for improving ocean dumping surveillance. What was the substance of these suggestions and what action has the Coast Guard taken on them?

**Answer.** There is continuing interaction between EPA and the Coast Guard regarding ocean dumping surveillance. Most of the recommendations revolve around additional commitment of resources and suggestions for increased surveillance of specific dumpers. The Coast Guard has responded favorably within the limits of its resources.

In pursuing enforcement action based upon early Coast Guard referrals, the testimony of the Coast Guard observer was occasionally controverted by one or more representatives of the respondent permittee also present at the site. Even when conflicts in testimony were not a problem, it was occasionally difficult for the Coast Guard observer to describe the observed violation with sufficient clarity. It was, therefore, suggested by the Region II Office that photographic equipment be employed in the Coast Guard's observation of dumping activities, and that all observable violations be recorded as photographic positives. It was felt that such colored photographs, in addition to having probative value in and of themselves, would assist in making the testimony of the Coast Guard observer more graphic and convincing.

Recommendations from the Region III Office to the Coast Guard for improving ocean dumping surveillance have included: (1) a black box device to record actual dumping with respect to location and time, (2) an increased number of barge riders, and (3) remote surveillance by aerial overflights or buoys.

Currently, the Coast Guard is providing aerial surveillance of every barge trip in the Gulf of Mexico to Region VI dump sites.

**Question 17.** It is the Committee's understanding that EPA conducted one or more site surveys at the Philadelphia dump site. How much did each of these surveys cost?

Please provide a breakdown of the costs for each survey by category, i.e., ship costs, personnel, laboratory work accomplished ashore, etc.

Why did Region III have to absorb the costs for this survey work?

Was any attempt made by EPA to request NOAA to conduct the site surveys?

**Answer:** A cost breakdown of the ocean monitoring program in Region III is provided as Attachment A. Region III has not had to absorb all the costs for this survey work. Resource commitments have also come from EPA Headquarters; the EPA's Environmental Research Laboratory in Narragansett, Rhode Island; NOAA; and the Coast Guard. Region III has provided, primarily, man-hours and supervision to the cruises, while actual money and contract support have come from the other sources. NOAA participated in some cruises, but did not have the resources available to do the entire task.

**Question 18.** Since the MPRSA was enacted, how many requests for specific survey or research projects has EPA made to NOAA?

Please cite specific examples where EPA has been successful in assisting to direct NOAA to conduct site or baseline surveys.

**Answer.** Close coordination has been maintained by EPA Region II with the NOAA's Marine Eco-Systems Analysis (MESA) Office in Stony Brook, Long Island. In fact, almost daily telephone communications have been maintained to ensure coordination of environmental studies being conducted by the respective agency.

In late 1973, EPA Region II contacted NOAA-MESA regarding the possibility of designating an alternate sewage sludge dump site, pending development and implementation of other environmentally acceptable alternatives to ocean dumping. The NOAA-MESA project was modified considerably to devote additional time and resources to field studies of both the existing dump site and of two possible areas in which to locate an alternate dump site. In March 1975, Region II and NOAA-MESA signed a Letter of Understanding which initiated an expanded field study of these alternate areas and the preparation of a report summarizing oceanographic and environmental data. The draft report was furnished to Region II in September 1975 and the final report is presently being published by NOAA-MESA. This report and others prepared by the NOAA-MESA Office are being utilized as a major input to the preparation of an Environmental Impact Statement on sewage sludge dumping in the New York Bight, which is currently being prepared by Region II.

Region III requested and received assistance for two cooperative submersible cruises (Gamma I and II) and for a six-month buoy study to study long-term trends. NOAA is conducting a series of studies of the toxic industrial wastes site in the New York Bight with participation of EPA. NOAA provided a ship and crew-time to support EPA's survey work of the first U.S. approved incident of ocean incineration in the Gulf of Mexico in the fall of 1974. A general Memorandum of Agreement between EPA and NOAA has been developed, under which studies of the Galveston and Puerto Rico dumpsites are being planned.

**Question 19(a).** Of the approximately 1.8 million dollars appropriated to EPA in Fiscal Year 1976, how much of that money was spent for the purpose of developing alternatives to ocean disposal of waste material?

**Answer 19(a).** None of the \$1.8M was utilized for developing alternative to ocean disposal of waste material. The \$1.8M was appropriated for the operation of the ocean dumping permit program and not to conduct research. However, approximately \$4.6M was spent on research relating to alternatives to ocean dumping.

**19(b)** Also, please list specific projects which have been carried out by EPA for the purpose of developing alternatives—(identify project, personnel utilized, funds expended, costs reimbursed to or provided by other agencies, etc.)

**Answer 19(b).** The following research projects have been or are being conducted and relate to the development of alternatives to ocean dumping of waste materials:

Title: "Land reclamation through the use of digested sewage sludge."

Grant: University of Illinois, \$700,000.

Report Information: Many publications in the technical literature.

Title: "Dewatering of sludge by filter press with ash filter aid."

Grant: Cedar Rapids, Iowa.

Report Information: Final report EPA-R2-73-231.

Title: "Study of utilization and disposal of lime sludges containing phosphates."

Contract: Monsanto Research Corp., \$78,420.

Report Information: Final report received. Filed in NTIS.

Title: "Aerobic stabilization of primary sludge."

Grant: Hollywood, Florida.

Report Information: Final report is available.

Title: "Mechanisms of sludge thickening."

Grant: U. of Illinois \$34,297.

Report Information: Final report received in the form of a collection of technical papers on thickening.

Title: "Park development with wet digested sludge."

Grant: Seattle, \$565,818.

Report Information: Final report EPA-R2-73-143; NTIS PB 217878.

Title: "Preconcentration of brines in evaporation cells as an adjunct to solar evaporation ponds."

Contract: Veracity Corp. \$43,000.

Report Information: Final draft report received and on file.

Title: "Investigation of electroosmosis as a technique for sewage sludge dewatering."

Contract: N. Amer. Rockwell \$79,966.

Report Information: Final report NTIS PB 17889.

Title: "Brine disposal design methodology for advanced waste treatment."

Grant: New Mexico State U. \$26,590.

Report Information: Final report received, filed in NTIS.

Title: "Treatment of wastes using peat, and peat in combination with soil."

Grant: Minnesota \$44,380.

Report Information: Final report received, recommended for NTIS.

Title: "Source control of water treatment waste solids."

Grant: U. Massachusetts \$60,177.

Report Information: Final report in preparation.

Title: "Microbiology of sewage sludge disposal in soil."

Contract: Ohio Agricultural Res. and Develop. Center \$56,289.

Report Information: Final report received, NTIS PB 237817/AS.

Title: "State of the art review on sludge incineration practice."

Contract: Resource Engineering Associates \$6,576.

Report Information: Final report published NTIS PB 197888.

Title: "State of the art review on product recovery."



Contract: Resource Engineering Associates \$9,500.  
 Report Information: Final report published, NTIS PB 192634.  
 Title: "Development of a digital computer subroutine for the total cost estimation of a multiple hearth furnace sewage sludge incinerator."  
 Contract: Rocketdyne Div. \$62,260.  
 Report Information: Final report published, NTIS PB 211264.  
 Title: "Availability . . . of equipment and machinery for disposal of sludges . . . on soils."  
 Contract: Ohio Agricultural Res. & Dev. Center \$22,179.  
 Report Information: Final report received.  
 Title: "Heat treatment of sludge."  
 Grant: Lake County \$645,907.  
 Title: "Ultimate disposal of brines from advanced waste treatment processes."  
 Contract: Burns and Roe, Inc. \$80,204.  
 Report Information: Final report WPCRS ORD 17070 DLY 05/70, also NTIS PB 197597.  
 Title: "Biological methods of sludge dewatering."  
 Contract: Aerojet-General Corp. \$91,487.  
 Report Information: Final report NTIS PB 207480.  
 Title: "Treatment of waste alum sludge."  
 Grant: City of Albany, N.Y. \$31,871.  
 Title: "Combined sludge processing project."  
 Contract: Central Contra Costa \$15,000.  
 Report Information: Final report EPA R2-73-250, NTIS PB 223341.  
 Title: "Critical review of experience with land-spreading of liquid sewage sludge."  
 Contract: Battelle (Columbus) \$55,378.  
 Report Information: Final report EPA 670/2-75-049.  
 Title: "Design, development and evaluation of a lime stabilization system to prepare municipal sewage sludge for land disposal."  
 Contract: Battelle-Northwest \$84,800.  
 Report Information: Final report EPA 670/2-75-012.  
 Title: "Summary report of pilot plant studies on the dewatering of primary digested sludge."  
 Contract: Los Angeles County \$19,466.  
 Report Information: Final report EPA 670/2-73-043.  
 Title: "Optimization and design criteria of an oil activated sludge concentration process."  
 Contract: Esso Research and Engineering.  
 Report Information: Final report EPA-670/2-74-004.  
 Title: "Experimental investigation of the aerobic stabilization of sludges from wastewater treatment plants."  
 Contract: Denver \$81,798.  
 Report Information: Final report NTIS PB 246593/AS.  
 Title: "Wastewater solids utilization on land."  
 Grant: Ocean County, N.J. \$200,000.  
 Title: "Capillary dewatering of waste activated and primary sludges."  
 Contract: Westinghouse Electric Corp.  
 Report Information: Final report EPA 670/2-74-017.  
 Title: "Magnetically assisted thickening of wastewater sludges."  
 Contract: R. P. Industries \$75,931.  
 Title: "Capillary sludge dewatering."  
 Grant: City of St. Charles, Ill. \$189,877.  
 Title: "Engineering design and cost parameters for lime treatment and sludge disposal, recovery, and reuse."  
 Contract: Brown and Caldwell \$49,910.  
 Report Information: Final report in press.  
 Title: "Pyrolysis of sewage sludge and sewage-sludge-solid waste mixtures."  
 Interagency Agreement: U.S. Bureau of Mines \$70,000.  
 Title: "Comprehensive study of sludge disposal recycling history."  
 Contract: Denver \$8,000.  
 Report Information: Draft final report being revised.  
 Title: "Chemical sewage sludge thickening and dewatering."  
 Contract: Envirotech (Elmco Div.) \$182,000.  
 Title: "Disposal of stabilized municipal industrial sludge in the forest."  
 Grant: Seattle \$78,000.  
 Title: "A review of techniques for incineration of sewage sludge and solid waste."

Contract: Roy F. Weston Co. \$72,280.  
 Title: "Safe utilization of sludges and wastewater effluents on land."  
 Interagency Agreement: Agric. Res. Service, Beltsville \$50,000.  
 Title: "Utilization of organic residues to improve sludge dewatering and produce usable fuels."  
 Contract: Systems Technology Corp. \$95,177.  
 Title: "Co-disposal of sewage sludge and municipal refuse."  
 Grant: South Charleston \$150,000.  
 Title: "Rotary kiln gasification of solid wastes and sewage sludge."  
 Contract: Wright-Malta Corp. \$53,820.  
 Title: "Co-incineration of sewage sludge with refuse and/or coal."  
 Grant: Twin Cities (Minn.-St. Paul) \$380,000.  
 Title: "Marketing survey of acceptability of composted sewage sludge."  
 Contract: CWO Consultants \$25,000.  
 Title: "Economics of sludge heat treatment."  
 Contract: CWC Consultants \$50,000.  
 Title: "Cost of alternative sludge transport options."  
 Contract: CWC Consultants \$25,000.  
 Title: "Cost of autothermic aerobic digestion."  
 Contract: CWC Consultants \$25,000.  
 Title: "Thermoradiation of sewage sludge using reactor fission products."  
 Interagency Agreement: Energy Res. and Dev. Admin. \$50,000.  
 Title: "Effect of feeding to cattle crops grown on sludge-amended soils."  
 Contract: Denver and FDA \$76,029.  
 Title: "Composting sewage sludge."  
 Grant: Maryland Environmental Services \$478,345.  
 Title: "Puretec wet oxidation of municipal sludge."  
 Grant: Philadelphia \$449,690.  
 Title: "Flue Gas Cleaning (FGC) Waste Characterization, Disposal Evaluation and Transfer of FGC Waste Disposal Technology."  
 Contract: The Aerospace Corporation \$200,000.  
 Title: "Shawnee Flue Gas Desulfurization (FGD) Waste Disposal Field Evaluation."  
 Contract: TVA \$200,000.  
 Title: "Lime/Limestone Wet Scrubbing Waste Characterization."  
 Contract: TVA \$50,000.  
 Title: "Lab and Field Evaluation of 1st and 2nd Generation FGC Waste Treatment Processes."  
 Contract: Corps of Engineers \$249,000.  
 Title: "Studies of Attenuation of FGC Waste Leachate by Soils."  
 Contract: U.S. Army Material Command—Dugway Proving Ground \$100,000.  
 Title: "Establishment of Data Base for FGC Waste Disposal Standards Development."  
 Contract: SCS Engineers \$100,000.  
 Title: "Conceptual Design/Cost Study of Alternative Method for Lime/Limestone Scrubbing Waste Disposal."  
 Contract: TVA \$50,000.  
 Title: "Evaluation of Alternative FGD Waste Disposal Sites."  
 Contract: A. D. Little \$200,000.  
 Title: "Lime/Limestone Scrubbing Waste Conversion Pilot Studies."  
 Contract: M. W. Kellogg \$200,000.  
 Title: "Fertilizer Production Using Lime/Limestone Scrubbing Wastes."  
 Contract: TVA \$100,000.  
 Title: "Study of Feasibility of Herbicide Orange Chlorinalysis."  
 Contract: Diamond Shamrock \$35,000.  
 Report Information: EPA-600/1-74-006.  
 Title: "Disposal of Organochlorine Wastes by Incineration at Sea" \$110,000.  
 Report Information: EPA-430/9-75-014.  
 Title: "Matthius III: Interim Operation, Monitoring, Sampling, and Analysis Protocol Guidelines."  
 Contract: TRW \$40,000.  
 Report Information: Task Order #17.  
 Title: "Phosphoric Acid Recovery System."  
 Contract: Douglas & Lomason Corporation \$100,000.  
 Title: "Precipitation of Iron from Acidic Process Liquors."  
 Grant: University of Arizona \$30,000.

Title: "Regeneration of Hydrochloric Acid Waste Pickle Liquor."  
 Contract: Toledo Pickling and Steel Service, Inc. \$222,088.  
 Title: "Treatment and Disposal of Complex Chemical Wastes."  
 Grant: State of Alabama \$314,525.  
 Title: "Electromembrane Process for Regenerating Acid from Spent Pickle Liquor."  
 Contract: Alabama Water Improvement Commission \$20,000.  
 Title: "Limestone Treatment of Rinse Waters from Hydrochloric Acid Pickling of Steel."  
 Contract: Armco Steel Corporation \$547,500.  
 Title: "Treatment Recovery, and Reuse of Copper Wire Mill Pickling Wastes."  
 Contract: Volco Brass and Copper Co. \$124,000.  
 Title: "Closed-Loop Recycle System for Waste Acid Pickle Liquor."  
 Contract: Crown Chemical Company, Inc. \$65,000.  
 Title: "The Reclamation of Sulfuric Acid from Waste Streams."  
 Contract: The New Jersey Zinc Co. \$164,560.  
 Title: "Ocean Disposal of Industrial Wastes."  
 Contract: E. I. duPont de Nemours and Company \$150,116.  
 Title: "Recovery of Sulfuric Acid and Ferrous Sulfate Waste Pickle Liquor."  
 Contract: The Fitzsimons Steel Co., Inc. \$39,056.

#### QUESTIONS FOR DR. ANDREW BREIDENBACH BY CONGRESSMAN JOHN MURPHY

**Question 1.** What has been your response to the charges in the lawsuit that has been brought against you?

Answer. *NWF v. Train* is still in the pleading stages. We have not filed an answer, and for this reason, it is premature to give a response to the specifics of NWF's charges.

**Question 2.** How would you respond to the charge which has often been raised against you that you have reversed the burden of proof? The law states that dumping must not be allowed unless it can be shown to not be harmful. Some charge you with allowing dumping unless it can be proven harmful. Would you like to see a change in the wording of the law?

Answer. From the beginning of the permit program, EPA has taken a highly restrictive approach by requiring all applicants to examine alternatives to ocean dumping and to select that alternative to ocean dumping that minimizes environmental damage. In some cases, EPA has permitted ocean dumping as a temporary alternative while the dumper is developing a more environmentally sound alternative.

Two recent decisions of Administrator Train have reflected our concern for the marine environment and our commitment towards phasing out the dumping of toxic pollutants. In October 1974, Mr. Train denied a permit to the DuPont Company in Belle, West Virginia, because there were inadequate scientific data upon which to make an informed judgment on the probable environmental effects of the proposed dumping. In his decision in September 1975, Mr. Train upheld the decision of EPA's Region III Office requiring the City of Philadelphia to phase out the ocean dumping of sewage sludge by 1981. The Administrator believed that the evidence presented had not demonstrated that there would be no endangerment to the environment if Philadelphia were allowed to continue dumping. In other words, the permittee, Philadelphia, failed to sustain its burden of proving that continued dumping would not endanger the environment.

**Question 3.** How would you respond to the charges of using different criteria for waste and dredged materials? Should the law allow this rather than call for the same criteria to be applied?

Answer. The same criteria are used to evaluate all wastes proposed for ocean dumping. There are some difficulties in applying the criteria to different types of wastes; therefore, some flexibility must be allowed in applying the same criteria to different wastes.

A special screening test for dredged material is included in the criteria because of the unique characteristics of dredged material. Dredged material is primarily land-derived sediment (dirt) which may have become contaminated with sewage or industrial wastes. Our concern is not with the sediment itself, which is inert natural material, but with any wastes that may have contaminated it and which may be reintroduced into the aquatic environment during the dredging operation. Thus, we are using, as a screening test for such materials, an elutriate test. This type of test is similar to the types of tests used to test soils to determine the availability of nutrients and other materials.

**Question 4.** Who is working on improving the criteria for dredged materials—you or the Army Corps of Engineers?

**Answer.** Both EPA and the U.S. Army Corps of Engineers are cooperatively working on improving the criteria for all wastes proposed for ocean dumping including dredged materials.

The respective staffs are in substantial agreement on the modifications necessary to improve the criteria, particularly for dredged material.

**Question 5.** What is the Environmental Protection Agency going to request that we authorize for Title I of this Act in the 1977 budget?

**Answer.** \$1,319,000 is the amount presently in the budget. EPA has requested authorization for \$4.8 million.

**Question 6.** How do you see those funds being spent? How much on site surveys? How much on reimbursable services by other Federal agencies? How much on administrative costs?

**Answer.**

**Fiscal year 1977:**

Contracts.....	\$430, 000
Interagency agreement .....	300, 000
Subtotal—baseline surveys.....	730, 000
Personnel costs.....	589, 000

<b>Total.....</b>	<b>1, 319, 000</b>
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**Question 7.** If EPA were appropriated an additional \$1 million now would you like to see that additional money spent for this program? What about an additional \$2 million?

**Answer.** If additional funding were appropriated it would be used for additional dumpsite surveys and to initiate feasibility studies on alternatives to ocean dumping for specific wastes. An additional one million dollars would enable us to start studies on one or two additional sites.

An additional two million dollars would enable us to start studies on additional sites and to initiate studies of alternatives which would supplement studies now being conducted by our Office of Research and Development.

**Question 7.** Have you planned where you intend to do the next site surveys in FY 1977?

**Answer.** Site surveys in FY 1977 are tentatively planned to continue at the Region II 106 Mile Industrial Site, and the Region III Philadelphia and Dupont Sites and to begin at the New York Acid Site, the Region VI Galveston Dump Site, and the Puerto Rico Industrial Site.

The actual number of surveys to be conducted will depend on the amount of funds available for the studies.

**Question 9.** What are EPA's long-range plans with regard to dumping in the New York Bight? Does Region II plan to phase out dumping as Region III did, or merely move the dumpsite?

**Answer.** EPA Region II has administered its ocean dumping program from its inception with the stated intent to phase out ocean dumping of municipal and industrial wastes by 1981, provided environmentally acceptable, technically feasible, and economically reasonable alternatives could be developed and implemented. For example, in August 1974, Mr. Richard T. Dewling, former Director of Region II's Surveillance & Analysis Division, in testimony before the U.S. Senate Subcommittee on Environmental Pollution, made the following statements regarding the development of alternative methods for the disposal of sewage sludges:

"EPA funded a two year, \$200,000 study with the Interstate Sanitation Commission to look at these (incineration, controlled ocean disposal, landfilling, soil conditioner or fertilizer) and other alternatives and to recommend, by June 1976, the acceptable alternative to resolving this (sewage sludge disposal) problem."

"We have developed and implemented a plan—with the ultimate goal of phasing out ocean disposal by 1981 . . ."

Region II has made significant progress toward phase out of industrial waste generators and is actively pursuing alternate disposal methods for municipal waste. Mr. Gerald M. Hansler, P.E., Regional Administrator, will elaborate on this program during his testimony before the next meeting of the Subcommittee in New York, New York.

**Question 10.** What is the rationale behind moving the New York dumpsite? Won't this only damage the environment at a new location?

**Answer.** Assessment of future needs and problems associated with the handling of municipal sludges in the New York-New Jersey Metropolitan area indicated that the construction of new and improved wastewater treatment facilities under P.L. 92-500 would increase by two- to three-fold the amount of sludge requiring ocean dumping. EPA, along with the National Oceanic and Atmospheric Administration (NOAA) recognized the potential environmental impact associated with dumping increased volumes of sludge at the existing sewage sludge dump site; particularly, the potential adverse effect on water quality along the bathing beaches of New Jersey and Long Island. Thus, in late 1973, initial contacts were made with NOAA on designation of an alternate dump site which could be used pending development and implementation of land-based alternative methods. Two "on-the-shelf" areas were identified by NOAA in March 1974 for consideration. Studies were initiated by NOAA to collect baseline data needed to assess the environmental aspects of ocean dumping in these two areas. In December 1974, EPA contracted a consulting firm (Dames & Moore) to prepare an Environmental Impact Statement (EIS) regarding the designation of a new dump site within these two areas. Potential environmental impact, economics, and social considerations will be addressed in this EIS. Also, an alternative action of continued use of the existing site, in lieu of moving to a new location, will be considered. The EIS will, therefore, evaluate the trade-offs of continued use of an already adversely affected area and the potential environmental damage at a new location. No decision will be made until after a Draft EIS has been completed, public hearings held, and the Final EIS issued. Present schedule indicates that the Draft EIS will be completed in late February 1976, public hearings will be held in New York City, southern New Jersey and on Long Island during the last week in March and the Final EIS issued in July 1976.

Even if the sewage sludge dump site is relocated, Region II's intent to phase out ocean dumping when acceptable alternatives are developed and implemented will continue.

**Question 11.** What do you see to be the future of ocean dumping?

**Answer.** The intent of the Ocean Dumping Act, as expressed by the members of this Committee, is to eliminate ocean dumping at the earliest possible date. Our approach in implementing the program, therefore, has been to insist on the use of any feasible alternative to ocean dumping.

**Question 12.** Are there any statutory changes you would like to recommend?

**Answer.** No.

**Question 13.** How would you respond to the charges by both the General Accounting Office and the National Wildlife Federation last week before these subcommittees that dumpers in Puerto Rico are turning to sewage treatment plants because of less stringent requirements?

**Answer.** There are presently nine (9) industries in Puerto Rico who have been issued ocean dumping permits. Three (3) of these industries have submitted a scheduled alternative scheme. The six (6) remaining industries have indicated a commitment to participate in the Barceloneta Regional Waste Treatment System (BSTP), which is designed to provide primary treatment. Issuance of ocean dumping permits to these industries, however, will in no way allow these industries to discharge to the BSTP in violation of any of the appropriate environmental laws. In this regard, the National Pollutant Discharge Elimination System (NPDES) permit for the Barceloneta facility will be issued to the Puerto Rico Aqueduct and Sewer Authority (PRASA) based upon complete conformity with Public Law 92-500 and the regulations promulgated thereunder. One of the relevant provisions of P.L. 92-500 is, of course, Section 403, the guidelines which currently require ocean discharges to meet the ocean disposal criteria established by EPA in 40 CFR 227. The NPDES permit, therefore, will not be valid if it discharges a mix of municipal and industrial wastes that result in violation of water quality standards for the receiving water or of Section 403 requirements. The industries who plan to phase out ocean dumping by connection to the BSTP facility, therefore, will be required to provide adequate pretreatment in order to ensure that all applicable environmental laws are complied with.

**Question 14.** How many revisions of criteria for waste materials have you had? Do you expect more? Is an Environmental Impact Statement required for each revision?

**Answer.** In order to implement the Ocean Dumping Permit Program in the spring of 1973 a set of interim regulations and criteria were developed in April

and May 1973, based on the state of the knowledge at that time of the impact of waste materials on the marine environment. Final regulations and criteria, published in October of 1973, were based on initial operating experience with the program and on public comment on the interim documents. The criteria, which have been established largely from laboratory experimentation, contain detailed quantitative test requirements and test procedures which are intended to estimate probable environmental effects of disposed materials. There have been no other published revisions of the Criteria since 1973.

EPA regards its present criteria as adequate to minimize any acute effects of dumping on the marine environment, and to keep such effects within reasonable levels. It does not, however, regard them as adequate to protect the marine environment against long-range, chronic effects from continued exposure to certain waste constituents, such as mercury, cadmium, organohalogens, and oils (which is why these constituents are prohibited as other than "trace contaminants").

EPA is concerned that the ocean dumping criteria, as they are now published, do not completely reflect the requirements imposed by the Ocean Dumping Convention. The regulations and criteria are currently under revision to remedy these technical deficiencies. Even so, the regulatory program currently utilized by both EPA and the U.S. Army Corps of Engineers substantially incorporates the requirements of both the Marine Protection, Research, and Sanctuaries Act and the Ocean Dumping Convention.

In May 1974, Administrator Train stated that EPA would voluntarily prepare environmental impact statements in connection with specified major regulatory actions, including criteria proposed after October 15, 1974, for the evaluation of ocean dumping permit applications.

Mr. LEGGETT. Thank you very much.

I appreciate your coming down here.

I guess that is all the questions we are asking for today.

Our next witnesses will be a panel from the Environmental Protection Agency, regional officials, consisting of Dr. Eric Schneider, Environmental Research Laboratory, EPA, Narragansett, R.I.; Dr. Will Davis, Environmental Research Laboratory, EPA, Gulf Breeze, Fla.; and Dr. Donald Lear, EPA Annapolis Field Office, Annapolis, Md.

**STATEMENT OF A PANEL CONSISTING OF DR. ERIC SCHNEIDER, ENVIRONMENTAL RESEARCH LABORATORY, EPA, NARRAGANSETT, R.I.; DR. WILL DAVIS, ENVIRONMENTAL RESEARCH LABORATORY, EPA, GULF BREEZE, FLA.; AND DR. DONALD LEAR, EPA ANNAPOLIS FIELD OFFICE, ANNAPOLIS MD.**

Dr. SCHNEIDER. Mr. Chairman, with your permission, I would like to read my statement and then answer questions.

Mr. LEGGETT. You may skip and read as you please.

Dr. SCHNEIDER. Thank you, Mr. Chairman.

My name is Eric D. Schneider.

I am Director of Environmental Protection Agency's Environmental Research Laboratory at Narragansett, R.I.

As a scientist working at the laboratory and field level, I welcome the opportunity to discuss research programs, problems and challenges posed by the Marine Protection, Research, and Sanctuaries Act of 1972.

The Environmental Research Laboratory at Narragansett is the Environmental Protection Agency's largest marine research installation and bears primary responsibility in ecological matters concerning ocean disposal.

There are two other EPA research laboratories that are involved in ocean dumping studies; our Gulf Breeze, Fla., laboratory, with its field station in Bears Bluffs, S.C., and our Corvallis, Oreg., laboratory with its field station in Newport, Oreg.

The Gulf Breeze laboratory mainly is focused on research dealing with effects of pesticides and chlorinated effluents on estuarine and marine organisms. Their involvement in ocean dumping research is in the area of improving scientific criteria that support EPA's ocean dumping regulations of persistent organic chemicals such as DDT and PCB's. The Gulf Breeze laboratory has been given responsibility for improving the Office of Research and Development's recommended bioassay methods manual. Methods described in this document are used to screen the toxicological properties of materials considered for ocean dumping by permit applicants or appropriate governmental agencies.

All three EPA marine research laboratories perform research to develop better bioassay procedures. The bioassay methods manual is a collaborative project of the three laboratories. Our Corvallis laboratory has been performing research on movement and ecological effects of sewage sludge dumped from barges in the New York Bight. Their studies are coordinated with NOAA's MESA program which is designed to examine marine ecosystem alterations caused by polluting materials entering the waters off New York and New Jersey.

The oceans are vast, covering three-quarters of the Earth's surface—and it is their very size and volume that can deceive us in evaluating their use as the ultimate sink for our wastes. Roughly 90 percent of the seas' area may be considered unproductive as compared to the 5 percent of the highly productive zone bordering the land. This productive zone is composed of the Continental Shelf, a few coral reef zones, and—most critical—our estuaries and embayments.

Scientists estimate that 85 percent of all marine animal species depend upon access to estuaries to complete their life cycles successfully. Also, some wastes do not dissolve completely or disperse evenly in the sea, but may tend to precipitate, settle out, and remain within miles of their point of entry. Thus, that portion of the sea closest to land—the Continental Shelf—requires the greatest degree of protection.

Questions such as "How much of the Continental Shelf may be used for ocean dumping?" and "What Continental Shelf sites are either least valuable or most resilient to insult?" must be posed and answered. These are the scientific and management questions posed by Public Law 92-532. At present, marine science is not in a very good position to answer all questions relating to ocean dumping from a basis of firm, site-specific knowledge.

Public Law 92-500 requires for 1977 best practicable control technology [BPT] for municipal wastes. EPA has defined BPT as secondary treatment. Such treatment enhances water quality—but it also produces sludge.

Secondary treatment of wastes, augmented by the construction grant program will continue to increase volumes of sludge produced. Thus the demand to ocean dump sludges will increase if alternatives are not implemented soon. Rapid implementation of alternative and

beneficial waste disposal mechanisms is critical to the protection of our living marine resources.

My scientific staff and I are of the opinion, based upon our observations of the marine environment and our limited research into ocean dumping effects, that there are very few waste materials indeed that may be disposed of at sea that have beneficial effects or no adverse effects upon marine ecosystems.

We believe that ocean dumping in general is a wasteful and environmentally damaging practice that should cease as rapidly as possible with the exception only of biologically and chemically inert materials placed so as not to disrupt the marine environment by their physical presence.

Testimony at the recent EPA hearings on the matter of the city of Philadelphia's interim ocean dumping permit has established that sewage sludge from major metropolitan centers can be disposed of by other environmentally and economically acceptable practices other than ocean dumping. The remaining problem of dredged spoil disposal assumes greater importance.

The chemical composition of polluted harbor dredged spoil is in many cases similar to that of sewage sludge. The scientific basis for distinguishing clean dredged spoil from polluted dredged spoil is still a controversial subject of research. The distinction may eventually prove more amenable to administrative operational decision criteria based on proximity to harbor pollution than to scientific decision criteria based upon bioassay of spoil for toxic or nutrient components. Present bioassay techniques cannot provide the kinds of information needed to evaluate the ecological impact of disposing polluted dredge spoil, and what is needed is research that gives an understanding of the deep water ecological systems involved to develop decision criteria that are scientifically and legally defensible.

Offshore research is very expensive. In assisting EPA region III by conducting 2 years of limited studies at the Philadelphia sewage and Du Pont chemical dumpsites, our laboratory alone expended 8.7 man-years at an estimated cost of \$304,000. In addition to this, the regional contribution of personnel from the Philadelphia office and the Annapolis laboratory and the U.S. Coast Guard's generous contribution of excellent ships and highly competent crews must be accounted for. I would estimate that an equivalent private effort would cost the taxpayer well in excess of \$1½ million. This does not include administrative costs or costs of preparing an environmental impact statement.

Under title II of the act, the Secretary of Commerce is charged to conduct a long-range research program on "effects of pollution, overfishing, and man-induced changes in ocean ecosystems." This language says to me, as a working scientist, that very close collaboration with the National Oceanic Atmospheric Administration or NOAA is necessary if our staff is to advise EPA's Program and Permit Offices on specific effects of ocean dumping on the marine environment and on implementation schedules of phasing out ocean disposal that we necessary for environmental protection.

We are now making progress in this regard at the laboratory level. On February 9, 1976, the ocean dumping team from our laboratory



will meet for the second time with the scientific staff of NOAA's National Marine Fisheries Center at Sandy Hook to plan our collaborative research on ocean dumping and to discuss the best and wisest division of our several divergent resources in this effort.

The National Marine Fisheries Service's Middle Atlantic Fisheries Center's experience in the New York Bight area and our Narragansett laboratory's experiences off the coast of New Jersey, Delaware, and Maryland are quite different, as have been our relative experiences in conducting research that is applied directly to regulatory functions and is subject to examination in adversary proceedings.

Our research capabilities are different also, in that EPA's laboratories cover a greater breadth of nonfisheries disciplines whereas NMFS laboratories are better able to analyze large numbers of biological samples taken at sea. This combination of interests, abilities, and resources should produce quantitative information to evaluate damage already done by ocean dumping. This, together with laboratory studies of model ecosystems stressed experimentally with various dredged spoils, sewage sludges, and industrial wastes, should provide a body of pertinent and reliable data from which ocean dumping regulations may be modified.

Research performed to date has emphasized persistent toxic waste effects on bottom dwelling organisms. This strategy is probably a sound judgment given the current level of knowledge, but we should not be misled by our own research strategy to believe that only toxic materials and bottom dwelling species are of concern—or that other biologically active materials are rendered harmless by dilution. Dilution is not likely to be an adequate operational approach for those materials that are biologically active in marine ecosystems. A worse case is dilution applied to persistent bioaccumulative materials. In addition, materials disposed of by dilution that have been thought of as harmless in the past may in fact be posing still to be solved problems.

Dr. James Carpenter of the University of Miami, testified under oath at the Philadelphia hearings that, at present disposal rates, sufficient nutrient addition could occur off our Atlantic Coast to cause measurable overenrichment of the microscopic algal population on the Continental Shelf by the year 2000. Such phenomena as summer blooms of nuisance algae over 20 miles out to sea may be observed today off New York Harbor. Greater research attention needs to be given to the effects of nontoxic wastes dumped at sea on the communities of plants and animals that inhabit the waters above the bottom.

Dumpsites vary geographically, as do living marine resources. Differing currents regulate whether materials dumped will be contained within the dumpsite area or widely dispersed. Thermoclines, often formed by wedges of deep, colder and more saline water coming in from the open sea to underlay certain dumpsites in summer and form a density barrier that inhibits all but the heaviest components of dumped material from reaching bottom at the dumpsite. This disperses materials over a broader area than one would believe from examining dumpsite boundaries drawn on a map.

Our Philadelphia dumpsite studies proved to us that a 50-mile square grid of sampling stations surrounding the two dumpsites

studied—Philadelphia and DuPont—was not large enough to detect the end of measurable heavy metal transport away from the sites. These sites were 50 miles offshore and in waters over 150 feet in depth. Two species of harvestable shellfish throughout the sampling area showed biological uptake and accumulation of heavy metals. These sites are considered to be dispersion sites. We still have not addressed the questions of whether containment or dispersion sites, on or off the Continental Shelf would be of greatest advantage for environmental protection purposes.

Scientific answers to regulatory problems must account for geographic differences in depth, current regimes, thermocline formation, seasonal changes, and unique distribution of marine life that require special protection. Coral reef communities such as the "flower garden" off the coast of Galveston or those off Florida, Puerto Rico, and Hawaii are particularly susceptible to insult from siltation or ecological imbalances. Routes of lobster migration on and offshore are little understood by ecologists and should be given special consideration in selection of dumpsites. Areas of finfish and shellfish harvest are jealously guarded by fishermen but areas where their planktonic juvenile states develop and grow require our stewardship also.

As our knowledge increases we may need to add "time" to our regulatory concepts, making certain dumpsites off limits during critical periods of the year when ecological or hydrographical conditions warrant special protective measures.

At present, bioassay is the best regulatory tool that research can provide, and EPA laboratories are working to make this methodology even better. We recognize, however, that the best scientific basis for regulation of ocean disposal is a firm knowledge and understanding of the marine ecosystem's response to the materials under consideration. Although this is presently beyond the state of our knowledge, we are enlarging programs having the research goal of making ecology a predictive science. Our laboratory ecosystems analysis, coupled with field verification of the results, should be adequately defensible for regulatory use within the coming decade. Meanwhile, we would encourage research to replace wasteful and damaging ocean disposal practices with environmentally beneficial uses of the materials that now are being cast into the sea.

Mr. LEGGETT. Very good.

Thank you very much, Doctor.

Dr. Davis, I have read your statement and you indicate you are part of the committee and that you are doing these bioassays and the assay will be required as long as we require and continue ocean dumping, and they continuously need to be updated, et cetera.

Dr. DAVIS. Yes, Mr. Chairman; you are correct.

Mr. Chairman, Dr. Eric Schneider has covered the broad aspects of the ocean dumping program in his testimony, so I will specifically discuss the formulation of bioassay methods to determine the toxicity of materials to be dumped in the ocean.

As Dr. Schneider mentioned, toxicity is only one criterion for measuring the impact of pollutants on the ocean. Other criteria, such as the movement of the material through the food web, and resulting concentration of the pollutants in plants and animals and the impact of the pollutants on the ecosystem as a whole are required also.

In other words, tests which only measure toxicity are insufficient criteria for measuring impact upon ecosystems.

I am a member of the Environmental Protection Agency's Ocean Dumping Bioassay Committee, chaired by Dr. Thomas W. Duke. The Committee was charged by the Assistant Administrator for Research and Development to provide bioassay guidelines for regional administrators to use in their permit program for ocean dumping.

Committee members include experts from the marine laboratories within the Office of Research and Development and from several regional offices that issue ocean dumping permits.

Members of this Committee participate in other activities involving bioassays as demonstrated by their participation in the marine bioassay workshop in 1974 sponsored by the American Petroleum Institute, the Environmental Protection Agency and the Marine Technology Society in which experts from various parts of the country met and produced a significant publication on methods and considerations of marine bioassays.

When the EPA Committee on Ocean Dumping Bioassays was formed to develop these guidelines, we separated our efforts into three discreet portions: The first phase was to develop simple static bioassays the second to develop more sophisticated flowthrough bioassays, and the third to develop methods to assay experimental environments or ecosystems. We have completed and published the static bioassay guidelines and are now in the process of publishing the flowthrough guidelines.

At the last meeting of our Committee held in Gulf Breeze, September 1975, we began discussions on methods for assessment of the impact of ocean-dumped pollutants utilizing experimental environments and ecosystems.

Dr. Duke and I agree that the bioassay guidelines developed by the Committee to date are not completely satisfactory, in that we must continually update bioassay techniques with newly developed methods and relevant test organisms. We do, however, believe that the guidelines developed by the Committee will represent current state-of-the-art practices in this country.

In summary, we have attempted to establish bioassay guidelines to be used in ocean dumping programs which are simple enough to be performed on a routine basis, yet elegant enough to yield necessary information on this part of an overall evaluation of the impact of a waste on the marine environment. We are continuing to update the bioassay guidelines to incorporate new developments and more rigorous scientific techniques and this process will necessarily continue as long as there is an ocean dumping practice.

Mr. LEGGETT. Very good. I thank all of you very much.

Now, we have two more witnesses and I would appreciate them joining you at the table. We have Mr. James Verber, chief, northeastern technical services unit, of Davisville, R.I. Is he here?

Then we have Mr. Carmen Guarino, the water commissioner of Philadelphia, Pa. Is he here?

Mr. BAUMAN. Dr. Schneider, you testified in your sampling you show a 50-mile square grid near the Philadelphia site where heavy metal pollution occurs to some degree.

Does that mean the shores of Delaware are also the sites of such deposits?

**Dr. SCHNEIDER.** No, it does not mean that. Fifty square miles does not mean 50 square miles in toward land. This would be an area, let us say, 5 miles across by 10 miles in a down-current direction.

[The following questions with answers were submitted for inclusion in the record:]

**QUESTIONS FOR ERIC SCHNEIDER BY CONGRESSMAN JOHN MURPHY**

**Question.** "What do you see as the future of ocean dumping?"

**Answer.** Ocean dumping in general is a wasteful and environmentally damaging practice which should be discontinued as rapidly as possible. As a practical matter, three rates of discontinuance may be recognized. Ocean disposal of industrial wastes can be stopped (and largely has been stopped) in the near term time frame—often with economically beneficial results to the industry (e.g. duPont's Edge Moor plant's iron acid waste is developing a profitable market as a wastewater flocculant).

Sewage sludge dumping may be the second most rapidly discontinued practice. Beneficial alternative means of disposal on land are available at present, according to sworn testimony given at EPA's modified adjudicatory hearings on the City of Philadelphia's ocean dumping permit in June 1975. Among these alternative uses are fertilizers for row crops, gardens, and orchards, strip mine reclamation, landfill, use in construction materials, pavements, and generation of fuel gases. Research on additional beneficial uses of sewage sludges and on site-specific disposal alternatives should, if performed diligently, provide the few remaining answers needed to eliminate all ocean dumping of sewage sludges (including the enormous New York City problem) within 5 years.

Third, and slowest to be resolved, is the disposal problem posed by dredged spoils. Some continued disposal of unpolluted materials at sea in dispersion areas may be found to be environmentally acceptable. However, polluted harbor spoils that are chemically similar to sewage sludges will most probably require alternative treatment or disposal methods. The Corps of Engineers presently is investigating use of these materials to create salt marshes and artificial islands. Other similar constructive uses of these materials should be reached rapidly and vigorously, as innovative and economically feasible solutions to the dredged spoil disposal question have not matched those for sewage sludges.

**Question.** "Do you believe that coordination of ocean dumping research between NOAA laboratories and EPA laboratories is adequate?"

**Answer.** Yes, it is generally adequate. Research activities at our Narragansett laboratory have been reviewed with those performed by NOAA's National Marine Fishery Service (NMFS) laboratories in the Middle-Atlantic region. It is this region where most ocean dumping activity is occurring. Since its inception in 1973, NOAA's MESA (Marine Ecosystem Analysis) program has focused in the New York Bight. Our laboratory located in Corvallis, Oregon has been coordinating a program dealing with a study of movement of sewage sludge dumped from barges with the MESA program office. NOAA's study of the New York area deep ocean dump site, located 106 miles seaward of New York Harbor, is in direct response to EPA's headquarters ocean disposal permit office. Our research involvement in this study has been limited to participation in the planning of the oceanographic surveys.

EPA monitoring of the Philadelphia sludge and DuPont acid wastes sites located roughly 50 miles from the mouth of Delaware Bay has involved NOAA's MUST (Manned Undersea Technology) program. A reconnaissance of the dump site was performed by a NOAA supplied research submersible.

In summary NOAA's ocean dumping research efforts have focused on the New York Bight region while EPA's ocean dumping research has concentrated on the dump sites seaward of Delaware.

**Question.** "If you could amend the Ocean Dumping Act, what statutory changes would you suggest?"

**Answer.** I am not able to make specific legislative recommendations. In general, however, I believe there is a need in several instances for consistency between the provisions of MPRS Act and the FWPCA and regulations promulgated pursuant to those Acts.

**QUESTIONS FOR WILLIAM DAVIS BY CONGRESSMAN JOHN MURPHY**

**Question 1.** Earlier witnesses at these hearings have testified that the organism being issued by EPA for its bioassays, the brine shrimp, is not an appropriate organism. These witnesses claim that the brine shrimp is not native to the environment being studied, and that it is harder than the organisms native to the marine environment in question. They argue that many organisms would die long before any adverse effect was noticed in the brine shrimp. Could you respond to this charge, please?

**Answer:** As an expedient to immediately fulfill the bioassay requirement in implementation of the ocean dumping program, a test organism was required which:

- (1) Had a long-term history of scientific and laboratory use.
- (2) Was adaptable to rapid bioassay tests, using either early life history or adult stages.
- (3) Was available on a year-round basis.
- (4) Was representative of some form of salt water environment.
- (5) Could be used by laboratories and personnel of diverse technical expertise to produce data for inter-comparison of test results.

The brine shrimp (*Artemia salina*) immediately met these criteria. The use of brine shrimp as a bioassay organism represented a first step in the development of bioassay tests for ocean dumping material analysis. Scientifically, bioassays often use organisms, or tissues, which have scientific precedence in laboratory testing, and can yield reproducible results for scientific and statistical analysis. In the specific case of brine shrimp use in bioassays, these organisms are available on a year-round basis and have previously revealed useful information and insight into the effects of petroleum components, chlorinated hydrocarbons, and the transfer of pesticides to both larval blue crabs and fishes. Therefore, it was appropriate to apply brine shrimp as a static bioassay screening organism during the initial phases of the development of appropriate bioassay procedures for complex wastes involved in sewage sludges. This is analogous to screening potentially harmful drugs or chemicals with tests using white mice to determine potential human health effects. The brine shrimp was never proposed or intended to be accepted as either a final choice or as a representative organism for Atlantic Ocean dump sites. The intention was that other organisms would replace *Artemia* as methodologies were developed. At the present time, *Artemia* as well as other organisms are recommended for use.

At the present time EPA is developing a bioassay methods manual which recommends a selection of other marine organisms including phytoplankton (algae), zooplankton (copepods), molluscs (clams, oysters), crustacea (shrimp), and fishes. As the scientific state of the art advances it is anticipated that the use of additional species and mixtures of species to represent specific dump site ecologies will be proposed.

It is appropriate to note that the EPA bioassay working group recommends using species appropriate for mid-water or the bottom (or benthic zone) depending upon the waste to be dumped. Sludge requires both benthic and mid-water species. Dredged materials, normally, would need more emphasis on benthic forms.

The bioassay methods manual draft has been in the hands of regional users for field testing. It is my understanding that, in addition to brine shrimp reference tests, bioassays involving fishes and other organisms have been routinely used in EPA regions for a year or more.

**Question 2.** Will the EPA be updating its criteria in the near future? What steps must be taken in issuing new criteria? Must an environmental impact statement be filed?

**Answer.** This question does not deal directly with research but it is my understanding that new criteria will be issued in the near future and that an environmental impact statement on the criteria will be filed.

**QUESTIONS BY CONGRESSMAN MURPHY TO DONALD LEAR**

**1.** How many cruises do you participate in?

Since May 1973, we have made 10 monitoring cruises off the Maryland-Delaware coast, plus three support cruises of short duration. See Exhibit A.

**2.** What areas did these cruises cover?

The areas covered varied, depending on cruise objectives. The primary cruise centered on the sewage sludge dumpsite and covered approximately 150 nautical miles.\* The cruise in February 1975, designed to find the extent of metals distribution in bottom sediments and organisms, covered approximately 3200 nautical miles.\*

Four oceanographic reports have been issued. Unfortunately, our stocks of these reports are depleted, but they are available from the National Technical Information Service, Springfield, Virginia, by the designations:

PB-229-781/2—Environmental Survey of an Interim Ocean Dumpsite, Middle Atlantic Bight. Compiled and edited by Harold D. Palmer, Westinghouse Ocean Research Laboratory and Donald W. Lear, Annapolis Field Office, EPA. September 1973. \$10.50.

PB-244-623/AS—Environmental Survey of Two Interim Dumpsites, Middle Atlantic Bight. Compiled and edited by Donald W. Lear, Susan K. Smith, Marria L. O'Malley. January 1974. \$6.25.

PB-239-257/AS—Environmental Survey of Two Interim Dumpsites, Middle Atlantic Bight—Supplemental Report. Edited by Donald W. Lear. October 1974. \$5.25.

PB-239-245/AS—Effects of Ocean Disposal Activities on Mid-Continental Shelf Environment off Delaware and Maryland. Compiled and edited by Donald W. Lear and Gerald G. Pesch, January 1975. \$7.25.

3. What were the dates of the cruises?

See Exhibit A.

4. What results have you come up with?

The results from the outset have shown measurable changes in the bottom materials and organisms. The program objectives have been directed toward longer range and duration effects, primarily metals in bottom sediments and the more mobile bottom animals. Some limited work in the water column has been done, primarily to understand the hydraulic transport of dumped materials. Uptake of metals in potentially commercial shellfish has definitely been demonstrated as a function of sludge dumping. There is also indication of widespread dispersion of dumped metals in bottom sediments. None of these effects is believed to pose a significant threat to human health or welfare at the present time. We are currently assessing the effects on benthic biological communities.

5. Of what significance are these results to EPA's ocean dumping program?

The results have been considered by the Regional Administrator in his decisions concerning the issuance of permits to dump sludge in two designated areas. These permits provide for progressive reduction in the amount of sludge dumped and a total phase out of dumping by 1981.

The monitoring program was designed, however, in such a manner that the data could also be used to develop principles for the management of continental shelf environments, i.e., the environmental responses due to known introduced contaminants at given levels.

6. In what direction do you think ocean dumping is heading? Where should ocean dumping be headed?

Testimony at various hearings in the past two years seems to indicate a phasing out of ocean dumping in the U.S. where feasible, and a careful scrutiny of the environment where the practice will continue.

The recovery of presently discarded materials seems to be an objective that solves many problems, but with considerable expenditure of effort. The continued use of the aquatic environment for the disposal of noxious materials should be discouraged. This must be done, however, in such a manner as not to prevent development of aquaculture or other productivity enhancing technology to improve the usefulness of the aquatic environment.

# EPA REGION III OCEANOGRAPHIC CRUISES

Cruise No.	Cruise name	Date	Vessel	Participants	Primary objectives
73-I	Operation Quicksilver	May 1-5, 1973	R/V Annandale	EPA III, EPA Corvallis, WORL, MSC, NMWQL, Cy. of Phila., EPA HQ.	Ambient conditions survey prior to sewage sludge dumping at this site.
73-II		July 13-14, 1973	Tug Mary Ann	EPA III	Retrieve water samples prior to dumping.
73-III			USCG Buoy Tender Sassafras	do	Retrieve sediment traps placed during Cruise 73-I—unsuccessful
73-IV	Operation Fetch	Nov. 5-11, 1973	R/V Annandale	EPA III, NMWQL, EPA Corvallis, Cy. of Phila. Am. U.	Determine conditions on sludge and acid sites. Retrieve sediment traps.
74-I	Operation Ides	Mar. 11-15, 1974	R/V Advance II	EPA III, NMWQL, AACC	Expand areas of observations. Make hydrographic observations.
74-II	Operation Piggyback	Aug. 7-9, 1974	R/V Atlantic Twin Submarine Nekton Gamma	EPA III, NMWQL, USGS, WORL, MSC, NOAA.	Examine bottom microtopography and visual indications of dumping effects.
74-III	Operation Deep Six	Aug. 12-15, 1975	USCGC Alert	EPA III, NMWQL, EPA I, Md., EPA Cinc.	Determine extent of distribution of metals.
75-I	Operation Midwatch	Feb. 5-10, 1975	do	EPA III, NMWQL, Smith. U. Md., NOAA	Expand area of investigation.
75-II		Apr. 1, 1975	Point Franklin	EPA III, NMWQL	Place current meters, sediment traps and bioassay cages.
75-III	Operation Dragnet	June 11-18, 1975	USCGC Alert	EPA III, NMWQL, U.W.Va.	Metals in benthos on large scale statistical grid. Examine Baltimore Canyon.
75-IV	Operation Sub-Strata	Aug. 17-21, 1975	R/V Advance II Sub Nekton Beta	EPA III, NMWQL, USGS, EPA HQ, U. Del., AACC	Examine and sample bottom microtopography. Verify oceanographic sampling techniques.
75-V	Operation Wakefall	Sept. 8-18, 1975	USCGC Alert	EPA III, NMWQL, Ray., USPHS	Determine behavior of released materials in water column. Visit selected historical stations.
75-VI	Operation Touchstone	Dec. 10-16, 1975	do	EPA III, AACC, Am.U., CBF, Ray., EPA HQ, Md., WORL, U. W. Va., Stock.	Detailed investigation of suspect areas. Visit historical stations.

## Participant code:

EPA III—EPA Region III, Philadelphia, Pa.  
NMWQL—EPA National Marine Water Quality Laboratory, Narragansett, R.I.  
EPA Corvallis—National Environmental Research Laboratory, Corvallis, Oreg.  
WORL—Westinghouse Ocean Research Laboratory, Annapolis, Md.  
Cy. of Phila.—City of Philadelphia.  
Am. U.—American University, Washington, D.C.  
AACC—Anne Arundel Community College, Arnold, Md.  
EPA I—EPA Region I, Boston, Mass.  
MSC—Marine Science Consortium, Lewes, Del.  
CBF—Chesapeake Bay Foundation, Annapolis, Md.  
Stock—Stockton College, Atlantic City, N.J.

Ray.—Rohrbaugh Corp., Newport, R.I.  
USGS—Geological Survey, Woods Hole, Mass.  
USPHS—Public Health Service, Davisville, R.I.  
EPA Cinc.—EPA Cincinnati.  
EPQ HQ—EPA Headquarters, Washington, D.C.  
Md.—State of Maryland.  
NOAA—NFMS, Oxford, Md.  
Smith.—Smithsonian Institution, Washington, D.C.  
U. Md.—University of Maryland, College Park, Md.  
U. W. Va.—University of West Virginia, Morgantown, W. Va.  
U. Del.—University of Delaware.

Mr. LEGGETT. You are Captain James Verber of the Food and Drug Administration?

**STATEMENT OF CAPT. JAMES VERBER, CHIEF, NORTHEASTERN TECHNICAL SERVICES UNIT, SHELLFISH [SANITARY] BRANCH OF THE FOOD AND DRUG ADMINISTRATION; ACCOMPANIED BY SAM D. FINE, ASSOCIATE COMMISSION FOR COMPLIANCE, FOOD AND DRUG ADMINISTRATION; TERRY S. COLEMAN, ASSOCIATE CHIEF COUNSEL FOR ENFORCEMENT, FOOD AND DRUG ADMINISTRATION; AND ROBERT C. WETHERELL, JR., DIRECTOR, OFFICE OF LEGISLATIVE SERVICES, FOOD AND DRUG ADMINISTRATION**

Captain VERBER. With the Public Health Service, the Northeast Technical Services Unit.

Mr. LEGGETT. You are the Chief of that unit of the Public Health Service, is that right?

Captain VERBER. That is right.

It is part of the Food and Drug Administration.

Mr. LEGGETT. Very good.

Your statement will be incorporated in our record and I see that you have about five maps.

Your statement is in our record so you can go ahead and proceed to emphasize it, shorten it, or read it in its entirety, any way you like.

Captain VERBER. Thank you, Mr. Chairman.

My name is James L. Verber and I am Chief, Northeast Technical Services Unit, Shellfish Sanitation Branch, Food and Drug Administration [FDA]. I am pleased to be here to discuss how ocean dumping is handled within the framework of the national shellfish sanitation program [NSSP], a consumer protection oriented program administered jointly by the States and the Food and Drug Administration.

The sanitary quality of shellfish and other marine food species is directly affected when pollutants are deliberately or accidentally discharged onto the Continental Shelf where these valuable marine food resources are produced and harvested.

Mr. LEGGETT. Are you a doctor?

Captain VERBER. No, I am an oceanographer.

We have learned through our studies that the quality of overlying waters and bottom sediments is adversely affected by these discharges and that this effect is subsequently reflected by the sanitary quality of shellfish populations in the vicinity of the discharges. Therefore, pollutants, such as sewage sludge and contaminated dredge spoils and industrial wastes, will affect the sanitary quality of shellfish and other marine foods in the area.

Shellfish are filter feeders and concentrate pathogenic bacteria, viruses, toxic industrial wastes and naturally occurring marine biotoxins.

Some species are eaten raw or only partially cooked. Thus, bivalved molluscs, specifically oysters, clams, and mussels from polluted waters,



may present an unusual potential for the transmission of disease to man.

Historically, back in 1925 the national shellfish sanitation program was initiated to insure the safety of shellfish. The program provides sanitary control over shellfish culture, harvesting and processing, and is the outgrowth of a widespread typhoid fever outbreak in the United States that began in the winter of 1924, caused by the consumption of contaminated raw oysters. The epidemic spread to 24 cities between November 16, 1924, and January 7, 1925, and over 1,500 cases and 150 deaths were reported. The epidemic resulted in a loss of confidence in the oyster and other shellfish industries and a reduction in the sale of all fishery products.

The affected industries and the control agencies of the shellfish producing States met with the Surgeon General of the U.S. Public Health Service on February 19, 1925, at Washington, D.C., as a special committee "to consider measures to insure the future safety, from the standpoint of health, of all shellfish."

The committee concluded that protection of the public health demanded action to prevent the continued transmission of preventable disease through shellfish, and that the affected industry needed to have public confidence restored and maintained if it was to be able to sell its product.

The formation of the national shellfish sanitation program [NSSP], which is currently administered by the FDA, resulted from this meeting. The program's standards, criteria and operating procedures are contained in the national shellfish sanitation program, "Manual of Operations," parts I, II, and III.

#### HEALTH CONSIDERATIONS

Historically, typhoid fever has been the principal disease associated with shellfish; the last United States case recorded was in 1954. Since 1961, infectious hepatitis has been the prime offender, the last large outbreak occurring in 1974. In addition, *Vibrio parahaemolyticus*, a true marine bacterium causing summary diarrhea in Japan, has been reported as a probable cause of shellfish-borne gastroenteritis. *Salmonella* and other disease-causing organisms have also been incriminated.

In Japan, 83 cases of severe mercury poisoning were reported from fish and shellfish, demonstrating that unreasonably high levels of industrial wastes in harvest areas are dangerous to human health. Currently more than 4,000 cases of methylmercury poisonings from seafood consumption have been reported in Japan.

Paralytic shellfish poison [PSP], a natural marine biotoxin produced by toxic dinoflagellates such as *Gonyaulax tararensis*, has never been found in the New York Bight, but has been found immediately north of Cape Cod. Toxic levels of PSP have been found in both species of sea clams in areas where toxic dinoflagellate blooms have occurred. Therefore, FDA must be alert to the possibility of occurrences of toxic blooms in the New York Bight and other ocean areas.

## TECHNICAL ASPECTS

The fundamental principle in assuring safe shellfish production is the sanitary control of the overlying waters. Accordingly, State and Federal agencies responsible for sanitary control of shellfish must identify pollution sources, classify and delineate known polluted areas, and assure that shellfish are not harvested from such areas. Under program provisions, the shellfish-producing States are responsible for growing area classification and control within their territorial jurisdiction.

The responsibility for control of shellfish growing areas on the Continental Shelf beyond the States' 3-mile jurisdictional limit is exercised by the Food and Drug Administration.

## OCEAN DUMPING AND SHELLFISH CONTROL

Since 1942, sea clam production has increased from 2.5 million kilograms—5.5 million pounds—to 43.5 million kilograms—96 million pounds—annually.

In the early 1960's, Federal shellfish control authorities became concerned about the proximity of sea clam harvesting areas to the dump sites in the New York Bight and conducted a series of Federal-State-industry discussions to develop and implement measures to insure the sanitary quality of sea clams subject to potential contamination from ocean dumping. As a result of these discussions, a bacterial study of sea clams in the area near the dump site was conducted in 1964.

Until this time, surf clams were considered as being geographically removed from sources of pollution. Previous to this time, dangers of contamination to the resource and harvesting areas were largely discounted. The gradual depletion of resources in the major sea clam harvest area off New Jersey and increased demand for the clams have caused the industry to expand its area of operation to the south and east in search of more productive shellfish beds. Likewise, heavy population and industrial growth along the coast have increased the amounts of chemical wastes, sewage sludge, dredge spoils and other wastes being disposed of at sea.

The 1966 New York Bight studies and the 1967 offshore Delaware Bay area studies were reported at the January 1968 national shellfish sanitation workshop and formed the basis for the first shellfish closures in the ocean proper. As a result of these reports and the concern of the Food and Drug Administration over the sanitary control of the sea clam, followup investigations were made in 1969 by the Northeast Technical Services Unit, FDA, with the assistance and cooperation of the National Oceanic and Atmospheric Administration's [NOAA] Sandy Hook Marine Laboratory.

In early 1969, the FDA began a review of all ocean dump sites to determine the extent of pollution sources which might affect shellfish and other marine foods. Following the initial ocean dump site studies, FDA began offshore classification and monitoring of other ocean dump sites near or adjacent to commercial clam harvesting areas.

## OCEAN DUMPING OF POLLUTED MATTER

The 1966-67 studies on offshore waste disposal, both in New York and Delaware, were the beginning of offshore studies conducted by several governmental agencies. The studies are now continuing and their overall costs exceed several millions of dollars annually. Increasing national concern over the ocean disposal of wastes lead to a succession of investigations beginning about 1968.

In the 1969 review, FDA tabulated 280 U.S. dump sites. These sites, coupled with direct ocean outfalls of municipal and industrial wastes, have posed a potentially hazardous health problem and have received the attention of the national shellfish sanitation program.

Atlantic coast waters affected by 128 dump sites, plus the municipal and industrial outfalls located within the 5.5 kilometer (3 miles) zone, are classified by State shellfish control authorities, whereas responsibility for classification of waters affected by 41 sites located within 5.5 to 22.2 kilometers (3 to 12 miles) zone has been assumed by FDA. The harvestable area beyond 22.2 kilometers (12 miles), some 20 sites, is in international waters and under a semi-Federal jurisdiction. The remaining 91 sites located in the gulf coast and Pacific waters are not associated with any commercially harvested shellfish.

As a direct outgrowth of the initial offshore studies in the New York Bight, a broad range of investigations were conducted in the areas adjacent to commercial harvesting. Bacterial, chemical, and radionuclide studies were pursued.

The magnitude of the problem can be better comprehended when one considers that sewage sludge dumping from the Greater New York area has increased 75 percent between 1965 and 1975. At the present rate, the 1965 volume will double by 1979.

Based on our earlier studies, the FDA prohibited shellfishing in the offshore New York and Delaware sewage dumping areas in May 1970 (figures 1 and 2); the "notice of closure" appears on the reverse side of the published map. A closed zone is also maintained in a small area of Boston Harbor which is contaminated by toxic chemical wastes (figure 3). The shellfish control agencies of the various States notified individual ship captains of the closures.

In 1970, 101 ships were harvesting sea clams, according to data provided by National Marine Fisheries Service, NOAA. The closed areas are routinely patrolled by the Coast Guard under an agreement with the FDA. The Coast Guard agreed to radio the FDA of any sea clam harvesting in the prohibited areas, and FDA, in turn, was to inform the State so that appropriate action can be taken. All Coast Guard reports under our agreement are forwarded to FDA annually.

The program has worked effectively, with only two reported violations by ships harvesting in the outer margins of the Delaware closure during the initial phase of the program and before they received a notice. In these two instances the action taken was informing these vessel operators of the restricted area boundaries and advising them to stay out of the areas.

As conditions changed, so did the closure notices. When increasing bacterial pollution from the metropolitan New York area expanded

the area of contamination to the inshore waters of New York and New Jersey, the FDA, in joint action with the States, extended the closure in April 1974 (figure 4). The extension was based upon studies conducted by the States of New York, New Jersey, and the Food and Drug Administration in 1972 and 1973.

Likewise, in the offshore Delaware area, the FDA took action to rescind the closure when all threat of contamination was past. In May 1973, the EPA closed the Delaware site to the dumping of sewage and moved the dumping area to a point more than 64 kilometers (40 miles) offshore.

After monitoring studies indicated that a bacterial problem no longer existed at the Delaware site, a cancelation notice was issued in January 1975 (figure 5), and the area was reopened. The new offshore dump site was not closed to shellfishing, as studies have shown that it does not contain economically harvestable quantities of shellfish; however, the area is being monitored.

The coliform population of sediments, either from dredge spoils or sewage sludge, appear to have a different die-off rate than is generally characteristic of coliforms in sea water. Coliform exposure to the marine environment has a 90 percent die-off rate in 2 days. The widespread occurrence and high bacterial values found in sediments in the New York Bight could hardly represent the dump practices of a 2-day period.

However, the contaminated sediments, when deposited in sufficient amounts on the bottom, appear to form an effective barrier to insulate the sediments from sea water exposure.

For example, median coliform and fecal coliform values (MPN/100 mi) for bottom sediments at the center of the New York sewage dump site, were 540,000/33,000 (total/fecal coliforms). The sediments at this location of the sewage dump continually show the highest bacterial values in the bight area.

The widespread areas of bacterial contamination effectively illustrate the persistence of bacteria in sediments and its long-term implications. Others have found that coliform bacteria may occur and persist in estuaries over 200 days.

The acid-waste dump site located 10 kilometers (5.5 nautical miles) southeast of the sewage dump center did not show any bacterial levels in the sediments at two stations in the middle of the acid dump grounds, that we occupied.

Efforts to find shellfish in the immediate area were also unsuccessful. Since no shellfish were found and the water depths were nearly 30 meters (the outer limit of sea clam habitats), no additional studies are being conducted in that section of the area.

#### SHORT DUMPING

Sewage sludge may be dumped short of its intended dump center for a variety of reasons; e.g., storms, ship malfunctions, navigational errors, etc.

The inshore New York zone has the most ship traffic of any port in the United States, but the short dump problem is more of a concern in the Delaware region than in the similar New York region. The reason for this is that short dumping at the Delaware site could affect a

sizable resource of inshore clam beds off the Delaware coast, which is not found in the New York Bight.

Past surveys in the Delaware offshore site indicate that sediments contaminated with total and fecal coliforms extended from Delaware Bay out to the old dump site. Bacterial values in no way approached those of New York, as the number of Delaware sewage barge dumps were normally scheduled every 3 days rather than daily and the volume of sewage dumped was only a tenth of that of New York.

Chances of short dumping are still very real in the Delaware area today even though the site for dumping sewage has been moved much farther offshore. The potential for a contamination problem is now greater as more harvesting area is being traversed by the sewage-laden barges.

#### CHEMICAL STUDIES

Periodically, shellfish and sediments are collected and analyzed for various trace metals. The last series of studies were made on shellfish collected from the new dump site being used by Philadelphia. The Environmental Protection Agency (EPA) performed chemical determinations for 13 metals (silver, aluminum, cadmium, cobalt, chromium, copper, iron, manganese, nickel, lead, titanium, vanadium, and zinc in shellfish). The FDA, which received portions of the samples, determined mercury levels in 9 samples of clams and 10 samples of scallops.

The values for mercury were more than an order of magnitude lower than the FDA limit of 0.50 mg/kg (0.50 part per million) for the safe consumption of shellfish.

FDA and other agencies have conducted similar studies in the New York area and have determined the mercury content of flounder, lobster, crab, and whiting. All mercury levels were less than 0.50 mg/kg.

Radioactivity in sea clams at stations in New York and Delaware were evaluated for tritium and gamma measurements by the FDA Winchester Engineering and Analytical Center.

Gamma values indicated no significant activity other than the naturally occurring isotope of potassium.

Tritium values for the tissue samples were insignificant. Determination of the pesticide levels of sea clams north of the New York sewage dump site—DDT, DDE, dieldrin and heptachlor—showed only a trace, and organophosphates were not detected. The only pesticide found in sea clams from three stations in the Delaware site was DDE at a maximum level of 0.19 mg/kg.

#### PRESENT PROGRAM

The Food and Drug Administration is watching the expansion of the sea clam harvesting activities along the southern Atlantic Coast to Cape Hatteras. Also, FDA is continuing its present surveillance studies northward and eastward to Rhode Island.

The Food and Drug Administration is concerned with protecting consumers from polluted shellfish and other seafood that may be detrimental to their health. The Agency will continue to take an active role in monitoring the offshore shellfish harvest areas, as it has

in the past, and in cooperating with other Federal and State agencies in the control of shellfish harvesting in areas affected by dump sites.

I would be pleased to answer any questions the committee may have.

[The various charts attached to Captain Verber's statement were placed in the subcommittee's files.]

Mr. LEGGETT. Very good, very interesting.

Now, you talk about your acid waste dump site did not show any bacterial levels of the sediments at the two stations and, in fact, you did not find any shellfish in the immediate area and so you stopped your studies on that.

Would that indicate, then, that the acid discharge has an effect on the shellfish in the area or did your study go so far as to deny correlation?

Captain VERBER. The principal studies we have been conducting are for the purpose of maintaining the areas for safe shellfish, the bacterial levels.

We have monitored the area to determine if there are shellfish present, if there is a bacterial or chemical problem present.

We cannot find any harvestable shellfish in that particular area.

Mr. LEGGETT. The cause for the vacancy is not your problem?

Captain VERBER. That is correct, Mr. Chairman.

Mr. LEGGETT. Now, on this short dumping there in the Delaware area, does not the Coast Guard have a capacity to monitor and put on tapes out to a direct line of site distance, or something like 13 miles, ship movements, and I know you cannot tell when a ship is dumping, but can you not determine whether a barge is, in fact, towing to the dump site and spending a period of time there?

Captain VERBER. Electronic methods have been considered for incorporation onto the barges.

I know this has been considered and work is going on in the Coast Guard on this method.

Mr. LEGGETT. In the San Francisco Bay, when the Arizona Standard ran into the Oregon Standard and the Coast Guard was monitoring the bay without any warnings so we have a complete record of those two ships colliding, and so the Coast Guard does have this capacity to monitor ships at sea, irrespective of what the ships have on board.

Captain VERBER. They do monitor for the Food and Drug Administration, as I stated earlier.

Everytime they traverse the area in one of their ships they do review the closed areas for shellfish activities.

This gives us an idea of how often surveillances are made so that we can control any contaminated shellfish from coming on the market.

These techniques I am not aware of whether they are in practice yet or not.

Mr. LEGGETT. Well, they are doing this in the San Francisco Bay or were doing it 5 years ago.

Captain VERBER. Right.

Mr. LEGGETT. Now, do you consider the problem in your jurisdiction getting worse or stagnant, or getting better?

Captain VERBER. The situation in the New York area is getting worse from the standpoint of effluent runoff from the Hudson. Rather

-than from the static dumping in the area, as we have closed the dump site itself.

Mr. LEGGETT. And are you making any recommendations considering the fact that things are getting worse?

Captain VERBER. We are considering other closures out at sea.

Mr. FORSYTHE. Mr. Chairman, would you yield at that point?

Mr. LEGGETT. Yes.

Mr. FORSYTHE. This New York Bight situation, what would your attitude be between opening up another dump site, for instance, off the Jersey coast, or closer to Long Island and closing the New York Bight? Would you be solving any problems or again just moving it and maybe creating even more?

Captain VERBER. Would you repeat that, Mr. Forsythe?

Mr. FORSYTHE. There is a suggestion that the New York Bight be closed and the dump site be moved off central New Jersey or off of Long Island.

Captain VERBER. I understand what you are referring to now.

Mr. FORSYTHE. Can you answer?

Captain VERBER. We are advising extreme caution at the movement of the dump site. It has been taken under consideration by Food and Drug. We are concerned about the potential contamination of other species we are not aware of at the present time. We are working with NOAA and EPA on this problem at the present moment, sir.

Mr. FORSYTHE. Thank you, Captain.

Thank you, Mr. Chairman.

Mr. LEGGETT. Now, the closing of the site of the New York Bight in your chart, is that still closed to shellfishing?

Captain VERBER. The figure 4, I believe, you are referring to, Mr. Chairman?

Mr. LEGGETT. Yes.

Captain VERBER. Yes, sir.

Mr. LEGGETT. And you have expanded that, is that correct?

Captain VERBER. That is right. This is the expanded version at the present time.

Mr. LEGGETT. When did you expand that?

Captain VERBER. This particular closure was expanded in April of 1972. The first closure was in May of 1970. These are changed whenever the criteria so indicates that we should either enlarge or contract it. We will make several studies out there and take this under advisement.

Mr. LEGGETT. When did you establish the 6-mile radius off the bight? I guess it is a 6-mile radius in the shellfish figure No. 1 attached to your testimony.

Captain VERBER. 1970.

Mr. LEGGETT. And that was the 6-mile radius and was about 4 miles off of Jersey and about 4 miles off of Jones Beach and then in 1974 while you extended that from the center of the dump site, all the way from about Jones Beach all the way down to Atlantic City, is that correct?

Captain VERBER. No, it is not close to Atlantic City. It goes inshore.

Mr. LEGGETT. South of Asbury Park, N.J.?

Captain VERBER. That is correct.

Mr. LEGGETT. And now would you expect since the matter is getting worse, that say, in 2 more years, you will in fact, limit taking all over Long Island and extend the matter down to Atlantic City?

Captain VERBER. I am not at the present time looking for any changes in the southern boundary along New Jersey.

Mr. LEGGETT. How about the northern boundary?

Captain VERBER. The northern boundary is presently under advisement with the State of New York and ourselves, possible changes in that line.

Mr. LEGGETT. What is the range of discussion?

Captain VERBER. It will change approximately 5 miles if we find the situation is, indeed, staying as we have now found it.

Mr. LEGGETT. At what point in Long Island would that extend?

Captain VERBER. That extends 5 miles northward. I believe it would be about the center of Long Beach.

Mr. LEGGETT. Mr. Forsythe, do you have any further questions?

Mr. FORSYTHE. Thank you, Mr. Chairman. No questions.

Mr. LEGGETT. Let us see.

The EPA witnesses, Dr. Davis and Dr. Schneider, Dr. Lear, you all indicate in your testimony that we need more research. Do you each need more research capability money and scientific expertise in your respective areas? Have you requested that of your mother agency?

Dr. SCHNEIDER. That is always a difficult question, Mr. Chairman.

Yes, I believe you do need more research and you do need more manpower if Congress wishes to solve these problems with the rapidity that they seem to want.

Well, we wish it but we need your help. We are trying to find out exactly how much help we are getting.

Dr. SCHNEIDER. I think it is only fair to say that the ocean dumping research program that I direct and, as I said, our laboratory is the key collaborative laboratory for doing this research within EPA, is allotted this fiscal year 3.2 man years and around \$460,000.

Mr. LEGGETT. What do you think you ought to have?

Dr. SCHNEIDER. It depends on what questions need to be answered and what priorities need to be set.

Mr. LEGGETT. Is the matter so constrained that you cannot even speculate on what real manpower and real problems you need to resolve?

Dr. SCHNEIDER. Well, let me put it this way to you. I said in my testimony the present ecology is not at all a predictive science. I do not believe that broad changes in predicting effects of pollutants on ecosystems will be solved by throwing a few more man years or even several more million dollars into it right now. The criteria work and work being done in EPA laboratories and under contract, is basically the state of the art.

As Congress has willed to us. EPA is to protect ecosystems in a broad fashion. That is a very difficult mandate then for us to do because in many cases you cannot put three ecologists in the same room and get them to define what are the prime characteristics of an ecosystem.

By throwing a lot of people and extra money into a short-range program, it is not going to answer questions that much faster.



When you view our ocean program, it is so limited and small. We are just doing species-by-species toxicology rather than looking at the total ecological systems. We could use additional help in ecosystem analysis.

How you face this is something that needs to be coordinated with other agencies. It needs to be well coordinated throughout the entire science community in the United States and it is not something that EPA can handle all by itself.

Mr. LEGGETT. Of course.

Is EPA, not Fish and Wildlife Service, who is working on this matter almost as a hobby and we find that the Corps of Engineers has the lushest budget in this area and is doing some very good work, but I find that out in my area in California, that really the Fish and Wildlife Service does not agree with EPA and EPA does not agree with the Corps of Engineers, and everybody agrees you need more money and I do not really find the requests for money coming from the agencies.

Of course, you have given us an answer that we ought to do something, but always we do not have enough money.

Dr. SCHNEIDER. In California you are very lucky to have the southern California water research project being led by Dr. Willard Bascom. There, they are working basically on a local basis, the small area of the Los Angeles outfall and studying the effect of pollutants there. They have a whole laboratory dedicated basically to this problem and they are making some inroads in the specific aspects of what is taking place there.

When you take EPA which is supposed to coordinate, oversee, and go to bat in the courts throughout the whole United States, not only on these issues, but other marine-oriented issues, we have only a handful of laboratories doing this work, and it is a meager effort at best.

Mr. LEGGETT. Mr. Sarbanes, could you chair for about 5 minutes?

I think that is about all the time we have.

I think the last witness is Mr. Carmen Guarino and we shall probably have to hear him this afternoon.

Mr. Eilbert is a senior member of our committee and we do want to hear from you, Mr. Guarino, and actually I want to review some of the Philadelphia situation with you myself, and we are going to be back here at 2 o'clock on the PCB hearings, so we will take Mr. Guarino at 1:45 as the witness and finish with him before the PCB hearing and we will finish with these witnesses at this point.

Mr. SARBANES. I have no questions.

Mr. MANNINA. Could I ask one, Mr. Chairman?

Mr. LEGGETT. Yes, sir.

Mr. MANNINA. Perhaps one of the gentlemen from EPA could comment on brine shrimp for the bioassay test.

The General Accounting Office criticized and said the brine shrimp would be alive when everything else was dead.

If there are alternatives to using brine shrimp, why are we not using them?

Dr. DAVIS. I was brought here to provide you that sort of a target, sir.

Mr. MANNINA. Believe me, you are not a target.

Dr. DAVIS. The question of using brine shrimp is quite controversial and must be realized that in the first document, which is a provisional interim draft and so forth, the brine shrimp was not recommended as a prime bioassay organism.

In fact, the answer to your question is, we give our most elegant and sophisticated answer, it would be some timelag before the contractors used by the region would be able to handle the animals without guidance.

Our own research involves marine species and brine shrimp has their role in the picture.

Actually, bioassays are evolving toward using a combination of species and a combination of pollutants.

Mr. MANNINA. So you do not have a species to bring off the ship that you think could be used for research—could do some research on?

Dr. DAVIS. We are applying the species at this moment to fish and we highly recommend the silver aphids as a research bioassay organism.

Mr. MANNINA. If I understood you properly, why are we not using these animals now if it is recommended to use that type?

Why do we not use them now?

Dr. DAVIS. From the point of view we are using that now as a regional source and perhaps the region has chosen to use brine shrimp in preference to silver aphids for a number of reasons.

They have expressed objection to the difficulty of maintaining some of the species that we have recommended.

It is there a case of training people in the contracting companies who are doing these bioassays, who are using them.

Mr. MANNINA. Thank you.

Mr. LEGGETT. Thank you gentlemen very much.

The subcommittee will stand in recess now until 1:45 this afternoon.

[Whereupon, at 12:10 p.m. the subcommittees recessed to reconvene at 1:45 p.m. of the same day.]

#### AFTERNOON SESSION

Mr. LEGGETT. The subcommittees will please come to order.

I note that we have our distinguished colleague from Pennsylvania, the Honorable Joshua Eilberg.

Josh, nice to have you here.

Mr. EILBERG. Mr. Chairman, it is my distinct pleasure and honor to introduce to you and your subcommittees the Honorable Carmen Guarino, the Water Commissioner of Philadelphia, Pa., and chief engineer of the Philadelphia Water Department, who will offer testimony on behalf of the city of Philadelphia on the issue of ocean dumping and municipal sludge disposal.

Carmen Guarino is a registered professional engineer in Pennsylvania and has a B.S. degree in chemistry and biology and is a diplomate, the American Academy of Environmental Engineering.

He has been employed by the Philadelphia Water Department for 25 years, during which time he has held every position from junior operating chemist to his current position as commissioner, in which he reports to the managing director of Philadelphia.

Mr. Guarino is particularly proud of the fact that he has operated all of the waste water treatment plants in Philadelphia.

The water department in the city of Philadelphia is unusual in the United States in that it combines both potable water and waste water activities in one department.

Mr. Guarino is responsible for the management of six large water and waste water treatment plants as well as many miles of water and waste water pipe networks.

One of his special goals is to bring complete instrumentation and automation not only to the treatment and distribution of potable water but also to the collection and treatment of waste water.

Upon request, Mr. Guarino has acted as a consultant on water and water waste to many foreign countries such as the Republic of China, Italy, Brazil, and so forth, EPA, the National Science Foundation, and the World Health Organization.

I say to you, Mr. Chairman, Mr. Guarino is a personal friend of mine, a man of great integrity, a man of great reputation in the city of Philadelphia.

I would like you to know I thoroughly support his view and I know that you will give him every possible consideration in his presentation today.

Mr. Guarino has advised me, with your permission, that he would just as soon file his statement for the record and summarize his remarks and make himself available for questions by you and members of the subcommittees.

Mr. LEGGETT. Very good. Thank you very much.

#### **STATEMENT OF CARMEN F. GUARINO, COMMISSIONER AND CHIEF ENGINEER, PHILADELPHIA WATER DEPARTMENT**

Mr. GUARINO. My name is Carmen F. Guarino and I am commissioner and chief engineer of the Philadelphia Water Department. I am here today to present my considered opinions on the status and functions of the Marine Protection, Research, and Sanctuaries Act of 1972 [MPRSA]. I must say that I greatly appreciate the opportunity to present my views before the subcommittees, especially after reading the proceedings of the hearings held in April 1975. To me, the statements heard then seemed a one-sided discussion of a complex, many-faceted issue. Most noticeably absent were inputs from the people with the responsibility for meeting MPRSA requirements. It is this type of input which I hope to provide in my comments. In doing so, it should lend a needed perspective to your considerations.

For over 25 years, I have worked toward the control of water pollution in all its forms. During this time, I have observed and been a part of many improvements in water pollution control regulation and technology. In my present capacity, I have, upon request, acted as a consultant in this field for the Environmental Protection Agency, the National Science Foundation, the World Health Organization, and other national and international organizations. Paradoxically, I now find myself often cast in the role of a "polluter." This may be because my long experience has led me to seriously question actions—often touted as solutions—before faithfully following their prescribed course.

This is especially true, I believe, of the issue of ocean disposal of digested sewage sludge and its attendant controversy. Philadelphia has not been blindly clinging to ocean disposal and disregarding the environmental consequences. Instead, we have been pursuing a goal of finding the best possible sludge disposal method among the many choices available. Because, at most, ocean discharges by Philadelphia can be considered as potentially damaging, we have continued to petition the regulatory agencies to allow us to consider ocean disposal as one of the choices available. At present, the way in which MPRSA has been administered will not allow this latitude which, in my opinion, is not only unduly restrictive but contrary to the thrust of environmental control in general. A brief discussion of Philadelphia's background and circumstance may shed some light on its position.

Philadelphia is located, as you all know, in the highly urbanized Northeastern United States. The Philadelphia Water Department serves an area of over 360 square miles by providing waste water treatment facilities for over 460 million gallons of waste water each day. The product of waste water treatment is, of course, digested sewage sludge. For many years, this sludge was disposed in on-site basins. As the available space was depleted by the early 1950's, the city began to explore other methods of sludge disposition. At that time, the state-of-the-art practices for east coast cities were considered to be somewhat limited. Methods used in other cities were investigated over several years until a decision was made to use the ocean as was New York, Los Angeles, Boston, and others. Ocean use by Philadelphia began in 1961 on a limited basis. By 1970, all of the sludge generated in Philadelphia was being dispersed in this manner.

The site chosen in 1961 [used until May 1973] is a 2-square-mile area located about 13 nautical miles off Cape Henlopen, Del. The choice was made by considering favorable ocean currents, depth of water, and the marginal value of shellfishing in the area. As public concern for the environment increased in the early 1970's, the ecological soundness of our dispersal operation came under review and criticism. We then contracted with the Franklin Institute Research Laboratories and the Jefferson Medical College to study the dispersal site to determine if any harmful effects had occurred.

The study concluded generally that there was "little if any measurable effect (found) in the disposal area." This is in spite of the fact that the research personnel conducting the study admittedly had a preconceived notion that their investigations would show large underwater areas covered with blankets of sludge and devoid of all natural life. The study results have been presented on many occasions. While the report may be lacking if compared to present standards, it did represent a good faith effort and was developed under financial and state of the art limitations that existed at the time. In spite of deficiencies, however, the study did show that the environmental impacts of a well-managed ocean dispersal program are far from obvious. Keep in mind that this work was completed prior to promulgation of Public Law 92-532.

Since the Marine Protection Act was signed into law in 1972, there have been many cruises and studies of Philadelphia's sludge disposal site (the location was moved to a 50-square-mile area located about

50 miles off the mouth of Delaware Bay). Beginning in May of 1973, the Environmental Protection Agency has conducted quarterly monitoring cruises in this area. We have retained the Raytheon Co. to perform similar studies. The common denominator in all of these efforts is that little or no harm to the marine environment can be documented.

In January, 1975, a report entitled "Effects of Ocean Disposal Activities on the Mid-Continental Shelf Environment Off Delaware and Maryland" was completed by EPA summarizing conclusions reached from data collected during their monitoring studies. The report draws several sweeping conclusions from what may be generously described as limited scientific data. In addition, it contains conclusions which imply adverse impacts without any factual basis. Without detailing these factors, let it suffice to say that EPA presumed too much.

Philadelphia's independent contractors reviewed the EPA documents and advised us that there were no foundations on which to base a conclusion of adverse impact. The present site had been in use for only 1 year when the EPA report was published.

Disregarding, for a moment, the scientific debate over the environmental effects of ocean dumping, I would like to mention some of the more questionable aspects of the Marine Protection Act itself. It is my experience that the provisions of MPRSA have not been administered uniformly at the regional level thereby causing an undue amount of controversy.

MPRSA was signed into law in October of 1972 without implementing criteria. Permits were first issued in May of 1973 under draft criteria and only upon passage of the final criteria in October of 1973 did the law assume its present form. By that time, Philadelphia had already been required to move its disposal site (a cost increase of 125 percent), conduct extensive analysis, and begin work on alternative methods of disposal. In fact, before the law was in final form, Philadelphia had already completed an extensive study of available alternatives. Key factors were identified which seriously questioned the feasibility of implementing many of the alternatives considered. Among these were the availability of land, adverse public reaction, and environmental effects. Further, by the time our first interim permit expired—February 1974—preparation had already begun for two large-scale research and demonstration programs that would investigate in detail two promising methods—land application for agriculture and wet oxidation with byproduct recovery.

In February of 1974, Philadelphia received its first 1-year interim permit. It required an inventory of industrial sources of metals, an extensive ocean-monitoring program, the implementation of a research project on a land disposal alternative, plus others. During the permit period, we completed a heavy metal source study, initiated an ocean-monitoring program, and prepared three grant applications for research and demonstration programs. In addition, we evaluated a wide variety of concepts ranging from transporting to the Middle East to manufacturing a cement-like solid product.

Meanwhile, we could not help but begin to note the difference in requirements imposed by region II where the large majority of ocean dumping takes place. The permittees in region II were not asked to

monitor their sites, which by the way, remained only 8 miles off the coast; their analysis requirements were much less severe; they had no requirement for implementing a research project; and they had no requirement for industrial source control. When asked, regional officials would only say the circumstances were "different." Different, yes; but if anything, far worse than conditions at our disposal area. It seemed to me then, as it does now, that a law passed on the national level should be implemented in at least a similar fashion across the country—same ocean, same law, same country. Such was, and is, not the case with MPRSA.

In February of 1975, Philadelphia received its second 1-year interim permit—keep in mind that only a year and one-half had passed since MPRSA had gone into effect. Without warning and citing the highly questionable conclusions reached in the January 1975 report discussed earlier, we were told in a permit condition that we must end all ocean dumping by 1981 and be 50 percent out in 1979. All this without consideration of the work already completed and/or underway. Completely disregarded was the fact that the land application research project required by the 1974 permit and developed with EPA personnel would not be completed until 1979—the same time a 50 percent reduction in sludge to sea was called for by the permit. No such abatement requirements were imposed by region II.

This action by EPA prompted me to write to Administrator Train requesting an adjudicatory hearing to review the conditions of the 1975 permit and their basis in fact. My request was granted and the hearing was held in Washington from May 19 to May 29, 1975. Intervening in the proceedings in opposition to the city were the National Wildlife Federation, the Environmental Defense Fund, the State of Maryland, and the State of Virginia. In addition to written testimony submitted prior to the hearing, well over 1,000 pages of exhibits were submitted and 1,740 pages of testimony were taken during the course of the 7-day proceeding. The following discussion will summarize Philadelphia's interpretation of the issues.

The propriety of the decision now to terminate ocean dumping at a date certain involved an assessment of two complex factual issues—the environmental effects of ocean dumping by the city and the existence of feasible, environmentally acceptable alternatives for sludge disposal. It should be stressed at the outset that Philadelphia was not seeking a determination that ocean dumping is the best or only long-term method for sludge disposal. We contended simply that it was premature to make a determination now that ocean dumping must be ended by a particular date. As a corollary to this position, the city was not claiming that the evidence to date established that there was no possible threat of environmental harm from ocean dumping. The city did assert that the facts available gave only the most tenuous and preliminary suggestion that the city's ocean dispersal was having any effect on the marine environment, and that monitoring and research activities during the next several years would substantially improve our understanding of the effects of ocean dumping. The city still believes that monitoring and research should go forward—and is willing to participate in the effort—in order to permit a more

informed decision to be made as to the environmental acceptability of controlled ocean dumping.

The availability of alternatives for the city received a great deal of attention at the hearings. Repeatedly during the proceedings we were questioned as to why we had not begun to implement alternatives when it is apparent from the record that, in less than 2 years from the passage of the law in final form, we had developed two large scale programs to investigate promising alternatives--programs developed with the cooperation and consent of EPA. Further, no one from region II was allowed to give testimony on their search for alternatives.

At the time of the hearings, some of the key factors identified by the city as early as 1973 had caused the \$5 million, EPA sponsored, land application research program to fail. Soon after the 1975 ocean permit was issued, the Letterkenny program was cancelled by EPA due to extremely negative public reaction. Questions by a concerned public on the environmental hazards of sludge application to land could not be answered. The program had been specifically designed to answer these questions.

The land program was going to be implemented on Federal land since EPA also recognized the problem of securing suitable land areas. To give you an idea of the seriousness of this factor, estimates are that from 2,000 to 3,000 acres of land would be needed each year to fully implement land application for Philadelphia sludge. Couple this with an average farm size in Pennsylvania of 63 acres and the highly populated conditions of the Greater Philadelphia area and you can see why land availability is a considerable obstacle.

Another factor to consider when evaluating land alternatives (the favored category of EPA) is that there are no formal criteria for evaluating the acceptability of the sludge for this purpose. For the ocean, there is the criteria of the Marine Protection Act which no municipal sludge can meet. For the air, there is the Clean Air Act, which makes incineration processes very difficult in large cities. For the land, however, there is only a draft interim guideline which is intended for use by EPA in funding approvals for construction of land application facilities. The criteria of these guidelines cannot be totally met by Philadelphia's digested sludge. Thus, the important point to remember is that it is extremely difficult to design and implement a land alternative without criteria from the regulatory agencies that specify what the city is, or is not, allowed to do.

In short, the city believes that further testing of the most promising alternatives should go forward in tandem with continued evaluation of the effects of ocean discharge, and is again willing to participate in the effort. One of the city's concerns with the present permit, entirely aside from the threshold question of whether enough is known to order an end to ocean dumping, is that the deadlines established could force the city to attempt to implement one or more alternatives on a full-scale basis before other, more promising alternatives--already identified and in the process of testing--have been adequately evaluated.

The appeal also requested that the ocean disposal program be more uniformly applied in the various EPA regions. The city feels that

region II, handling the New York Metropolitan Area, is approaching the problem in a far more reasonable manner. Unrealistic deadlines or demands are not part of their permit strategy.

The decision on the appeal was announced on September 25, 1975, and briefly states that the ocean disposal program should and can be phased out as specified in the permit.

Since the administrator's decision, we have developed a 10-point program that will attempt to meet the ocean dumping abatement schedule contained in the 1975 permit. Fundamentally, the program involves a number of different methods, including methods that are promising but largely unproven in large scale applications, that will be implemented on a sufficient scale to meet the deadlines. Because a great deal of development work is needed for each method, it is the goal of the 10-point program to accomplish this development while ocean dumping is being ended and then have the data and information needed to choose a long-term solution, or set of solutions, for Philadelphia.

I have now, I believe, brought you up to date on the situation that has developed in Philadelphia. The primary reason is that the criteria of MPRSA cannot be met by Philadelphia's sludge or, for that matter, any municipal sludge. As you may know, the two sludge constituents which exceed MPRSA criteria are mercury and cadmium—both potentially dangerous heavy metals.

The criteria state that mercury concentrations in the barge must be less than 0.75 mg/kg in the solid phase and 1.5 mg/kg in the liquid phase while cadmium must be less than 0.60 mg/kg (solid phase) and 3.0 mg/kg (liquid phase). Philadelphia's sludge, and all municipal sludges for that matter, exceed the criteria for both metals in the solid phase while being well below limits set for the liquid phase. Is sludge a two-phase substance? This depends entirely on the method specified for preparing the samples. Draft methods are now being used and they vary in different EPA regions. (An illustration of the importance of this question is that, if sludge were considered as a liquid, it would exceed the MPRSA criteria by only 1 p.p.m. for cadmium.)

The wording of the act is unclear as to what is intended by the distinction between solid and liquid phases. Presumably, if any distinction is warranted, it should be based on what happens to sludge in the ocean which, under present research priorities, has received little attention. No consideration seems to be given for dilution which drastically reduces the effective concentration of the waste. Since toxicity is directly proportional to concentration, i.e., availability, limiting discharge by such low concentration values of the waste before dumping seems overly strict.

It is interesting to note that we have not been able to identify any point sources of mercury in extensive studies. For cadmium, the electroplating industry contributes a good portion but estimates show all controllable point sources of cadmium (including platers) contribute 20 percent or less of the total cadmium entering the treatment plants. Further, almost all cadmium plating is a result of a Federal specification (QQP-416) which could, if allowed, be replaced by a zinc strike in most cases.



Thus, complete elimination of all point sources would not result in meeting the MPRSA criteria. In fact, the vast majority of metals in sludge are a result of the way we live and "background" inputs such as rainfall, corrosion, street dust, and so on. To ask an individual municipality to prescribe industrial pretreatment, as is the case in our interim ocean dumping permits, is not warranted. Instead, as a national problem, pretreatment should be regulated on a national level.

To this point, I have focused on Philadelphia's experience with respect to ocean dispersal and the Marine Protection Act. In the letter inviting me to appear before the subcommittees, I was asked to comment on the administration of the act and a list of suggested questions was provided as guidance. From reviewing my earlier comments and based on direct experience, I find there are several serious deficiencies in the manner in which the act has been interpreted and administered.

The implementation of MPRSA has resulted in conditions which cannot be met by any discharger of sewage sludge thereby effectively eliminating any consideration of ocean use as a disposal alternative. This is contrary to my understanding of the intent of environmental control regulation. Simultaneously, the bulk of data collected on environmental effects of controlled sludge discharges indicates little change, if any, and does not reinforce the apparent underlying conclusion implied by the regulations issued under MPRSA that discharges in excess of criteria will cause real damage. In addition, the interpretation of environmental data has not been performed uniformly and knowledge of cause and effect relationships in the marine ecosystem is severely limited. We are left with an inconsistent situation which, on the one hand, establishes rigid criteria to protect the environment from potential dangers while, on the other hand, it generates evidence and data that cannot be adequately interpreted to determine if these potential impacts have actually occurred.

Resolution of this situation requires a great deal of work on the part of the regulatory agency in determining cause and effect relationships, proper monitoring procedures, and a consistent means of evaluating the resulting data. As for the level of funding, I can only point out that Philadelphia has already expended over \$300,000 in ocean monitoring work alone and will spend a similar amount in the upcoming year.

At the Regional level, administration of the MPRSA requirements has varied widely. EPA Region II has not set inflexible deadlines for termination of ocean dumping and continues to include ocean disposal as a possible choice among the methods being investigated. The Interstate Sanitation Commission has only recently completed Phase I of a study of alternatives—a study funded by EPA. This study is essentially the same as the study completed by Philadelphia in June of 1973 and funded solely by Philadelphia. Phase II of the ISC study is now underway to study in detail the most promising alternates. There can be no justification for this degree of difference between EPA regions. The Marine Protection Act is a law passed by Congress and implemented by a Federal Agency. By the way, the ISC Phase I Report for the New York Area recommended against land applica-

tion (favored in EPA Region III) as a possible alternative and recommended further study of pyrolysis systems.

A very short time has elapsed since the passage in final form of PL 92-582 and its criteria. From a regulatory standpoint, there seems to have been a rush to find environmental harm and thereby justify implementation of alternatives—no matter what the cost or impact. This has resulted in a fragmentation of effort and a waste of total resources. Compliance with permits alone in the form of reports, hearings, data, and so on has become a laborious and time-consuming task. Requirements of one permit have been superseded or dramatically changed by the requirements of the next again causing a waste of resources. From the National level, a definitive evaluation of the MPRSA objectives is needed to give direction and uniformity to Regional programs.

The relatively short period of time under which MPRSA can be evaluated is also significant when considering the availability of alternatives. Deadlines, such as those contained in our 1975 Permit, could cause implementation of a disposal method before it has been adequately tested and evaluated. A false start, *i.e.*, an alternative implemented and then abandoned, can waste literally millions of dollars. Consider, for a moment, alternatives which may show promise but cannot be fully considered under rigorous schedules since it would take too long to design and build the facility. Pyrolysis is a good example as is the use of solar energy. In our Ten Point Program, pyrolysis will be evaluated but we fully realize that the system cannot be adequately studied, designed, built, and operating by 1981. The same is true for the use of solar energy as a means of sludge drying—a concept we have been discussing recently. Under rigid schedules, such innovative ideas cannot be fully considered. The time has come for a serious appraisal of all sludge disposal methods, including ocean disposal, and a set of definitive criteria by which alternatives may be fully evaluated.

In addition to the false start potential cited above, the real cost of water pollution control continues to rise. For example, the Capital Program for Philadelphia (Fiscal Year 1976–Fiscal Year 1981) is now estimated at \$1.9 billion. The plant expansion program to full secondary treatment will cost on the order of \$415 million or 21.8 percent of the total Capital Program. The present cost of operating our three wastewater treatment plants is about \$8 million per year. When the facilities are expanded, the operating cost will rise to an estimated \$18 million per year for treatment plus an additional \$15 million per year for implementation of the Ten Point Program—a total of \$33 million per year. This is an increase in operating costs of over 400 percent when compared to present expenditures. All of these costs will be borne by the people of Philadelphia—possibly in increased rates—and must be justified by real improvements.

#### CLOSING REMARKS

The city of Philadelphia is now placed in a difficult position. The law has been applied differently in two large metropolitan areas sharing very similar problems. Permits have been issued that convey a

feeling of urgency while environmental assessments have shown no need for such precipitous action.

This feeling of urgency brings to mind some critics of our ocean disposal activities. The same people who loudly voice fears and accusations that discharging digested sludge *forty miles* off the coast will degrade their beaches are, at the same time, effectively dumping tons of *raw sludge* only a few thousand *feet* off the same beaches through ocean outfalls.

The law, unless interpreted differently, will eliminate ocean disposal as a sludge disposal alternate. This places a financial burden on many Northeastern communities using ocean disposal. If Philadelphia's experience is typical, it is unlikely that substantial cost increases to the community can be balanced by environmental improvement in the ocean.

I have often thought that one particular area of ocean research has been lacking under the MPRSA. Very little research has been conducted into the possible benefits of discharging certain wastes to the ocean in a controlled manner. The continental shelf on which most activity takes place is nutrient deficient. Why then, after careful study of loadings, etc., would it not be possible to "fertilize" the ocean in much the same way we would use sludge to fertilize the soil. At the least, it deserves consideration.

In summary, the entire situation should be rethought and the real impacts of the law assessed. Future burdens should also be evaluated in light of what is being gained environmentally. Experiences of other countries regarding ocean disposal, particularly England, should be studied. Ocean disposal of sewage sludge should be properly managed. The problem may have been overmanaged, however, resulting in elimination rather than control.

Mr. LEGGETT. You are an engineer, Mr. Guarino?

Mr. GUARINO. I am a registered professional engineer.

I have been formally trained in chemistry, biology and engineering.

Mr. LEGGETT. You are not a doctor type?

Mr. GUARINO. No, I am not. At least I do not think I am.

Mr. LEGGETT. You have control in Philadelphia of sludge?

Mr. GUARINO. Yes, I do.

Mr. LEGGETT. Before Mr. Eilberg leaves I want to thank him very much for coming down here and making the introduction.

Mr. EILBERG. My pleasure, Mr. Chairman.

Mr. LEGGETT. Do you have control of waste water discharges in Philadelphia?

Mr. GUARINO. Yes, I do.

Mr. LEGGETT. And you have the whole works.

All right, well, you did not get a chance to give your total testimony this morning, and certainly I have read your total case in chief, which we certainly will review very particularly, and I presume that the city of Philadelphia, in spite of all the innuendos this morning, does have a progressive program, that is looking forward to compliance with the highest aspirations of the Federal legislation at the earliest possible date.

Mr. GUARINO. Yes, sir; we do.

Mr. LEGGETT. You can explain that to the committee.

Mr. GUARINO. All right, Mr. Chairman.

Well, I did want to tell you a little bit about our background.

Mr. Chairman, we have been at this waste water treatment for many, many years, and actually, up until 1961, we were able to dispose of our sludge entirely within the area of the city of Philadelphia, places that the city owns, operates, or maintains.

About 1961 we used all the space that my predecessors had set aside for us, clear back to 1914, so we had to look for some other place. We hired the best consulting engineers in the business, Greeley & Hanson, and studied the available 17 methods; we came to the conclusion, the most environmental acceptable method was to take the sludge to sea, such as was practiced by New York, Los Angeles, and many other communities.

Mr. LEGGETT. What year was this, did you say?

Mr. GUARINO. 1961. We initiated ocean sludge disposal.

Actually, at the time, we were just taking sludge from the northeast treatment plant, which represents about one-half of the production of sludge in Philadelphia.

In 1967 when the lagoons became filled at the southwest plant we transferred that out to sea.

About 1971 realizing the reaction from Maryland and Delaware, we hired the Franklin Institute and the Jefferson Medical College to make a study of the area we were using at that time, which was about 13 nautical miles off of Cape May.

The conclusion at the end of that year was we had done no harm whatsoever. They could not measure any degradation.

The investigators from both Franklin Institute and the Jefferson Medical College did register some surprise, because like most people they expected that when they went out to the disposal site they would find the sludge on the bottom and could measure it by the foot. They found nothing whatsoever.

It was hard, Mr. Chairman, to find anything indicative of pollution.

In 1973, after the passage of the act we are talking about today, we were told to move out 50 miles from the mouth of the Delaware, about 40 miles off of Ocean City, Md.

At that time we did not object to it at all, because we realized EPA had a problem, they had a law they had to follow, and we also had to have a place to dispose of our sludge, so we moved, and we thought this would settle the problem until we could find a better method.

In spite of all the requirements imposed upon us we had to monitor our new site. We had to check all the industries, and we had to look into alternatives.

In spite of that, quite surprisingly, when we applied for a permit in February of 1975 we were told that we would have to be out of the ocean entirely by 1981, and 50 percent out by 1979.

We appealed for several reasons. I thought the time was not sufficient, and I did not know of any harm from all of the reading I had done, and we tried to do it the best we could in that regard, and from our own consultants. Raytheon, we could not see any harm.

The third reason was that I thought there was an inequity as far as the application of the law was concerned.

Here, Mr. Chairman, I am referring to the New York Bight. As you know, about 26 communities dispose sludge in that location. It is about 8 miles from shore.

We could not understand how region III could have so many requirements for us, and yet, have nothing like this for region II. That is, they were not required to monitor the site, not required to conduct industrial surveys, and they were not told they had to ban the ocean dumping at least 50 percent by 1979.

I appealed on that basis, and in September of 1975 I was told my appeal was denied.

We embarked on a program, and by the way, let me say one more thing here. I do not mean to say that region II was wrong in how they handled the problem in New York.

I think that region II was more logical, more practical, because they had the benefit of the study from EPA, you know, the study financed by EPA for the Interstate Commerce Commission.

EPA indicated that land disposal was not the way to go in New York, but instead they should look for some method like pyrolysis, which is still in the experimental stage.

Well, regardless, our appeal was denied. We were told to come up with a plan where we would phase out ocean disposal by 1981.

We came up with a 10-point program where we are going to move in several directions at the same time to try to meet the schedule.

Mr. LEGGETT. As I understand the New York sludge site, it is to phase out by 1981, and the New York acid site is to phase out by 1981, or burning waste within limits of criteria.

Mr. GUARINO. That is correct.

Mr. LEGGETT. Apparently, as I see it, the New York sludge site is 1981, the Galveston site is 1977, including the No. 106 site, your site is 1981, the Du Pont site is 1978, the New York acid site is 1981 as I indicated, and the Puerto Rico site is 1978.

Mr. FORSYTHE. Mr. Chairman, will you yield?

Mr. LEGGETT. Certainly.

Mr. FORSYTHE. The thing that concerns me about the New York situation is that to move it from that site to one off the beach of New Jersey doesn't solve the problem.

Mr. LEGGETT. Well, that should concern you.

Mr. FORSYTHE. It does.

Mr. LEGGETT. Mr. Perian, will you speak for New York?

Mr. PERIAN. I have nothing to say.

Mr. GUARINO. The point, Mr. Chairman, is that we were 13 miles out, and we were moved, and now there is a tremendous amount of pressure to get out entirely.

Meanwhile, New York is still 8 miles out. I think we should analyze why region II made that decision in deference to region III.

Mr. LEGGETT. Of course, what has happened over the past 3 years, the New York site, the bight there, where they are dumping as they indicated this morning, that ban on taking shellfish has expanded by two or three times the area which is generally correlated with the sighted dung in the preliminary area off of. I guess, the Delaware River you are concerned with, where they indicated that they abated taking shellfish there because there were not any shellfish.

Of course, we have had complaints all last year from the folks down there in Ocean City. We were hearing testimony then on another issue, to wit, the 200-mile fishing limit, but the mayor of Ocean City, I recall, was quite concerned with the waste that was coming down there, and they were complaining they were literally destroying their beaches.

Mr. GUARINO. Mr. Chairman, I want to try today, if I can, to speak to you as honestly, and as best I know how, and I could be wrong, but I want to give you the benefit of what I know about things.

Mr. LEGGETT. Let me interrupt once more.

You indicated Los Angeles was dumping their sludge, and that does not show in the charts that we have gotten out of EPA.

Has Los Angeles stopped doing that?

Mr. GUARINO. I am sure they are still discharging from that line that goes 8 miles out. I think they're planning to stop.

Mr. LEGGETT. That would be an outfall rather than a dumping.

Mr. GUARINO. That is correct. They built a pipeline some years ago, and all the journals published how wonderful it was, and now 10 years later it has to be abandoned.

Mr. FORSYTHE. Mr. Chairman, that point is important. The outfalls do not come under the Dumping Act. They come under the Clean Water Act.

Mr. LEGGETT. Why do we differentiate between outfalls and dumping, whether or not you take and dump it in a barge and take it out 20 miles and get rid of it, or whether or not you have a pipe running out 8 miles; why do we differentiate?

Mr. GUARINO. I can give you one reason that you could not possibly implement a law that would tell you to terminate sludge from that standpoint; that is, because every coastal community that I know of discharges into the sea.

Now, let us get back to Ocean City for a moment. I have checked into the treatment plant Ocean City, Md., has, and if my information is correct, they have a primary treatment plant that removes about 30 percent of the suspended solids.

This is information I received from the EPA region III in Philadelphia.

Mr. Chairman, that means that 70 percent of the raw sludge is discharged through the outfall, which is 3,800 feet offshore.

I say to you that the risk of pollution in the beaches, the risk would be much greater if you discharge your raw sludge 3,800 feet offshore than it would be to transport it 40 miles out to sea.

I cannot understand why Ocean City is so hard on us, yet does not consider their own case.

If there is pollution on the beach at Ocean City, I would say it would come from their own sewage, and not from taking the sludge 40 miles out to sea.

Mr. Chairman. I want to be as correct as I can. I think if that outfall was designed properly it should not pollute the beaches, but I want to make the point Ocean City is complaining about our operation, yet they discharge 3,800 feet offshore.

I do not want to take up too much of your time, but I do think that we should consider what possible benefit could be had for the ocean.

I understand this morning we got into that a little bit, and Mr. Carpenter talked in terms of too many nutrients in the sea. This does not check out with the greater abundance of information we have.

If you checked with Dr. Hood in Alaska, and other people, they will tell you that the Continental Shelf is nutrient deficient, and the Shelf is quite a bit responsible for the food we eat, and 75 percent of the oxygen we breathe.

Mr. Chairman, we should not lean entirely from taking the sludge from the sea. We should consider that it may have some benefit.

It is ironic that I should have been able to receive a permit legal completely, but for two items, cadmium and mercury.

The criteria is such that I doubt any municipal sludge in this country could meet the criteria they have for cadmium and mercury.

With mercury there is not any possible source in Philadelphia. If we have mercury in the sewage it is being washed out of the atmosphere.

For cadmium, I think cadmium we could cut down on that if we eliminated the platers.

A simple thing like a test procedure makes a difference between us meeting and not meeting the criteria.

If I was in the laboratory, and had to analyze a sample in a gallon jug, I would shake it up and I would pour out a sample.

That is not the procedure you follow here, Mr. Chairman. You have to separate the solids from the liquid and analyze differently. If we can analyze a sludge sample as it leaves the plant we would meet the criteria for mercury, and just about miss it for cadmium, and with a tightening up with the platers I could meet it entirely.

A little detail like that is why I am here today, and one of the reasons we are being chased out of the ocean.

Mr. LEGGETT. How do you respond to some of these that say why should Philadelphia be allowed to dump into the ocean when you say a landlocked city like Omaha, Nebr., does not have that privilege?

Mr. GUARINO. I would answer this way.

First of all, I do not know if Omaha may have land which Philadelphia does not have.

Philadelphia is very densely populated, as you know. I cannot go outside of town like some towns can and dispose of the sludge. We have tried it. We have gone to 26 different communities. It is extremely difficult, and to this date we have not been able to find any community that will take our sludge.

Maybe we will find some land but the experience has been that if I go to Scranton, Pa., people do not want to be seen with me, because they are zeroed in by the local community.

Mr. LEGGETT. I know how they feel, because San Francisco has had a plan to deposit all their solid waste in my county, and our folks have not responded to that realistically.

Apparently, the courts in this area have responded on the so-called *Blue Plains* case. I do not know if you are familiar with that case.

Mr. GUARINO. Yes, I am.

Mr. LEGGETT. And the assistant attorney general from the State of Maryland came before the committee, and he indicated that they

are trucking and disposing of just jillions of cubic tons of sludge from a 3 or 4 million populated area in the metropolitan area here, including Fairfax County.

I see no reason whatsoever why Philadelphia and the Camden area cannot do exactly the same thing within an 18-month period of time.

Would you like me to send him up there?

Mr. GUARINO. Certainly.

In fact, we do not have to go that far.

I have my consultants in the audience with me, and they will tell you if you try to do something like that, they have been looking for alternatives for 3 or 4 years.

In Maryland they are vacuuming the sludge. Right off the reel you can dispel that.

Mr. LEGGETT. It is not the same kind of sludge?

Mr. GUARINO. It is not in the same kind of process. They have vacuum-dried it. They have gotten to the point where maybe it has 70 percent moisture, and at that point it looks like something you can shovel, in contrast to our sludge, which is liquid.

Mr. LEGGETT. Now, the difference between that is what?

Why is the sludge different?

Mr. GUARINO. Well, because they have installed vacuum filters many years ago.

These, Mr. Chairman, are big drums that pick up the sludge, and the vacuum inside the drum pulls the moisture out, and you wind up with a sludge cake, which is easily transported.

Mr. FORSYTHE. Mr. Chairman, on that very point, may I ask what is the cost of that?

Mr. GUARINO. It is about, I would guess, between \$20 to \$30 a dried ton.

Mr. FORSYTHE. Over and above the treatment you get?

Mr. GUARINO. Yes.

Mr. FORSYTHE. That is really the reason why you do not do it?

Mr. GUARINO. In our case it was not until 1973 that we saw the ocean disposal criteria, and could tell we had trouble.

Until 1973 in our field, ocean disposal, that is proper ocean disposal, was an acceptable method, and it was not until after 1973 we were told, we saw the criteria, and we had to think in terms of the alternatives.

Mr. FORSYTHE. What would be the annual cost to Philadelphia?

Mr. GUARINO. We are talking now in terms of 200 tons, but the \$20 or \$30 would not cover the disposal cost, but cover just the cost of taking the water out of the sludge.

Chicago right now, if you want to talk in terms of cost, Chicago is paying \$150 to \$200 a dry ton, in operation in Fulton County, Ill.

At the present time, for ocean disposal, it is costing us about \$22 a ton. When we leave ocean disposal, the cost will go up astronomically.

Let me tell you about a project initiated by EPA. We had a public relations problem, and we had to demonstrate that you could put sludge on land, so we worked with EPA for about 1½ years putting together a program in a demonstration grant using federally owned land, an Army depot at Carlisle, Pa., and got right to the edge where we were going to start this operation.



There was a hearing, and I do not know where the people came from, because I only saw 5 or 10 people when I visited the site, but 1,010 people showed up that took a vote, and 1,006, or something like that said "No."

That killed the project, which was to demonstrate land disposal on Government land.

I mention that to give you an idea of the problems of land disposal for a city like Philadelphia.

Mr. LEGGETT. Now, the due date has been given you as 50 percent in 1979, and 100 percent in 1981.

Do you see your way clear at this point to reach those goals?

Do you have any program whatsoever to get there?

Mr. GUARINO. We have a program. We have a 10-point program which we submitted to the EPA, and I think with some exceptions, they have accepted it, but I must tell you in all honesty, Mr. Chairman, I am not sure we are going to reach it.

You talk about New York in 1981. I am not a betting man, but I would bet anybody New York will never be out of the ocean dumping business by 1981. It is impossible.

Mr. LEGGETT. How much will you spend, how much will it cost you between now, and let us say on an annual basis, after 1981?

Mr. GUARINO. When we were 13 nautical miles out the cost was less than \$1 million per year. When 1981 rolls around, if we implement the program we have now, it will be something like \$20 million a year.

The cost will go up 15 to 20 times. Now, costs in cities like Philadelphia are a serious consideration. They look at a capital program for the city of Philadelphia between now and 1981. It is \$1.9 billion.

The expansion of treatment plants, to ocean disposal which is related, is going to cost \$415 million, which is almost 22 percent of the capital program.

The operating costs of sewage treatment today in Philadelphia is \$8 million.

When I have the three new plants on line it will go up to \$18 million a year.

When you add the \$18 million to the cost of sludge disposal, it is going to go up to something like \$35 or \$38 million a year, which is a 400-percent increase.

That gives you some idea of why I am doing my best to try to pick out a good and economical alternative for sludge disposal.

Mr. LEGGETT. The \$38 million as compared to what?

Mr. GUARINO. Right today it is \$8 million.

Now, that does not cover the other costs. This is just treatment. It does not cover the cost of the sewer system, administration and repair.

Mr. LEGGETT. But you might get a big grant for the sewer system.

Mr. GUARINO. It is still somebody's money.

Mr. LEGGETT. I know, but you disagree with the rationale for being quite so pernicious with their sludge in the ocean.

Mr. GUARINO. I was glad you invited me here today. Mr. Chairman, because I have the greatest respect for Congress. You do have to write the laws, and I have the greatest respect for the EPA, but the bottom line is people like me who have to execute the law, and I

would suggest to you, you get more people like me in here to get to talk to you so you can know the fact of implementing the law.

Mr. LEGGETT. Well, I think we should get the folks from New York down here, maybe from Los Angeles, too, and more thoroughly go into this.

Generally, what recommendations are you making to the State?

Mr. GUARINO. I would say, sir, that we should not be so anxious to rush to alternatives. We are not sure of the alternatives.

We do have a 10-point program. We have a very interesting demonstration project which we are being helped on by EPA to try another process called Purotek. It is a great program.

If this works, I think we may generate a profit from sludge.

We expect to start this, Mr. Chairman, at the end of the year. It is the Purotek process and we are going to use sulfuric acid under pressure to generate energy, to recoup the cost of sludge treatment.

I think we are going to find out as we proceed that money is very important, at least in Philadelphia.

Mr. LEGGETT. Well, money is, and certainly we have to weigh it against various kinds of things, and I wish you would provide us with a copy of your 10-point program.

Mr. GUARINO. I certainly shall.

Mr. LEGGETT. That will be helpful, and laws to be reviewed even after they have been enacted, even with respect to the rationalization of reasons.

That is one of the reasons why we are conducting oversight hearings like this.

We have to go vote on a matter.

Do you need to talk to us any more, Mr. Guarino?

Mr. GUARINO. No; and I appreciate your time.

Mr. LEGGETT. We will read your paper.

We have enough other witnesses for a different hearing this afternoon.

Mr. GUARINO. You have been patient with me. I hope I did not rub anyone the wrong way.

Mr. LEGGETT. Thank you very much for coming.

[The following was received:]

#### RESPONSES TO WRITTEN QUESTIONS FROM CONGRESSMAN MURPHY

(By Carmen F. Guarino)

Re: Ocean Dumping Testimony.

*Question 1.* You state in your testimony that ocean discharges by Philadelphia can be considered at most as potentially damaging. The wording of the Act is that ocean dumping must be halted unless it can be proven that it is not harmful. And yet you contend that Philadelphia should still be allowed to consider ocean dumping as an alternative. Do you therefore feel that the goal of elimination of ocean disposal by the 1980's is unreasonable or unattainable?

*Response.* First, the words "potentially damaging" were very carefully chosen in order to be as fair and accurate as possible. Realizing that many things are harmful if found in overabundance, the scientific data available at this time does not indicate measurable harm but, as always, the potential remains. Our position on ocean disposal of digested sludge is that it should not be eliminated as an alternative unless and until enough is known about the trade-offs of these potentials between ocean use and other sludge disposal techniques. All sludge disposal methods have, to some degree, a potential for environmental harm.

I feel that the goal to eliminate ocean disposal by the 1980's is not realistically attainable for the large cities employing this alternate. In Philadelphia's case, a tremendous amount of resources has and will be dedicated to the phaseout program. Many millions of dollars above and beyond present costs will be dedicated to this effort. Whether or not the City is completely out by 1/1/81 depends on factors such as the availability of land (required for many of the alternates proposed), and acceptance by the public of land disposal techniques. These factors cannot be accurately forecast. Again, I feel it is unreasonable to strike this alternate without a full knowledge of the pros and cons of all sludge disposal systems.

**Question 2.** Is it reasonable to put the burden of proof on the dumper to show that he is not doing harm to the environment?

**Response.** Let me answer this question in two ways. I feel it is unreasonable for the dumper to perform general research about the impact of ocean disposal. This type of work requires tremendous technical resources and is best handled at the Federal level. This is evidenced, I believe, by the excellent work being performed by numerous governmental agencies studying disposal sites off the East Coast. On the other hand, I do feel that it is reasonable to have the dumper do specific research aimed at the characteristics of his particular waste material and its effect on the ocean. To give you an example, Philadelphia has spent well in excess of \$300,000 in ocean research. For a large city this magnitude of research dollars is not overly burdensome. To ask a much smaller community, however, to participate in ocean research would be very burdensome to that community. The number of questions that have to be answered do not change markedly with the size of the community or the amount of material disposed. I feel each dumper should, on some kind of a sliding scale basis, participate in the research effort, and I would encourage that the effort be of a joint nature between all concerned Federal groups and the dumpers. It is very convenient for the regulatory agency to simply place all the burden on the dumper. However, as I explained above it is not at all times practical.

**Question 3.** In reference to the January 1975 EPA study which found evidence of damage as a result of Philadelphia dumping, do you know how many monitoring surveys this report was based on? As one who has been involved in environmental affairs for 25 years, how many surveys do you think would be required for a thorough and factual report on the effects of Philadelphia's dumping?

**Response.** I would like to correct your beginning statement regarding evidence of damage at the Philadelphia dump site. After a careful technical review of all information, no evidence of damage could be supported statistically. I would refer you to the many hours of testimony on this subject conducted in Washington in May of 1975 when we appealed our interim permit. I would also suggest that Raytheon Corporation (Philadelphia's oceanographic consultants) be made available to your committee to clear up your impression regarding evidence of damage. The results you speak of were based on two surveys and parts of others. It is interesting to note that sparse background information is available on our present dumping site. When we were moved to that site in 1973 there was so much emphasis on moving us and only a hastily planned and fragmented baseline survey (Operation Quicksilver) could be conducted. For comparison's sake, I am sure you are quite familiar with the baseline studies now being conducted for two future sites in the New York area. These studies are being performed under the auspices of NOAA, all with Federal dollars, and are quite comprehensive.

Regarding the second part of your question, I am not sure anyone could determine how many surveys would be required to determine the impacts of ocean disposal. From our past exposure to ocean research we understand it is highly complex, and therefore I won't even venture a guess. I feel that to assess impacts properly a substantial baseline study should be conducted followed by quarterly research cruises where various monitoring programs are indicated. It is my understanding that in our dump site very little information exists concerning current patterns and how they vary over the year. Without basic information like this, it is impossible to determine what the distribution of the digested sludge is, once at the dump site. I think that this question should be referred to competent researchers in the many Federal groups that are working on the ocean, and I would be surprised if they would come up with any definite answer either.

**Question 4.** Do you have any studies going on now to rebut the evidence presented in EPA's January 1975 report?

**Response.** Philadelphia does have oceanographic studies under way. Their purpose is however not to try to rebut the "evidence" presented by EPA. Instead the purpose is to expand the data base from which a reasonable decision can be made. Our primary objection to EPA's study and report is not the data itself but the manner in which the data was interpreted, i.e. data said by EPA to demonstrate an adverse impact. Thus it is our position not to attempt to rebut the EPA evidence by conducting duplicative studies which would be a waste of resources. We do contend, however, that a uniform, or at least unbiased, methodology for interpreting oceanographic data is badly needed. This could be accomplished by administering the monitoring programs for all EPA regions on the national level or possibly by retaining an independent organization, funded by both the EPA and the municipalities involved, to perform the assessment of environmental impacts.

**Question 5.** You referred on page 4 of your statement to a study that Philadelphia completed before October 1973 of alternatives to ocean dumping. What other alternatives besides land disposal were looked into? How extensive was this study?

**Response.** The study you refer to was performed by our consultants, Greeley & Hansen, and is dated June of 1973. The report, in addition to land disposal, discusses incineration, pyrolysis, heat drying and composting. The report discusses 8 land application alternates which include 3 irrigation techniques, plow-in, tanker application, trenching, spreading and incorporating, and land filling, in addition to composting, incineration, pyrolysis and heat drying. Each alternative is presented with cost estimates and discussions of environmental considerations. The report is quite extensive and has been sent by request to many of the municipalities in the United States. A great deal of the format and general conclusions were used in a comprehensive report prepared for the Interstate Sanitation Commission entitled, "Phase I Report of Technical Alternatives to Ocean Disposal of Sludge in the New York City-New Jersey Metropolitan Area."

**Question 6.** You also referred on page 5 to the study of alternatives to ocean dumping "ranging from transporting to the Middle East to manufacturing a cement-like solid product." Could you expand on your discussion of this study?

**Response.** The reference on page 5 of my statement to studies of ocean dumping alternates was intended to illustrate that there are a wide variety of concepts for sludge disposal which we have reviewed. In many cases our review of these many ideas was severely hindered by a lack of technical data. For example, in meetings with one organization we discussed the possibility of transporting our digested sludge to the Middle East in empty oil tankers. The discussion yielded no more information than that. While we did request additional information pertaining to scheduling, access to ports, destinations, costs, and other technical aspects of the idea, we received no further communication. We have also seen concepts that would make sludge into roofing tile, that would produce cinderblocks, or that would make a cement-like fill. Concepts of this nature are largely untested and untried and have very little supportive documentation so that a sufficient review was very difficult. The point to remember about this field is that it is a radical departure from what could be classified as "state-of-the-art" methodology. For the most part, time is the key ingredient that will some day, we hope, provide a full blown concept that is acceptable from all viewpoints. Time, according to our abatement schedule, is one thing of which we have very little.

**Question 7.** You pointed out that the EPA policies did not seem to be equitably and uniformly implemented. If Region II were as strict as Region III, might the research that would be done by New York into alternatives to ocean dumping be helpful to Philadelphia? In fact, what use has Philadelphia made of the results of other experiments in land disposal, such as in Illinois or Maryland?

**Response.** First I would like to clarify my position regarding equitable treatment between regions. I am pointing to the New York situation not to show that their standards are any less strict but to indicate the different approaches taken under the same law. I do feel that Region II has a better appreciation for the magnitude of the problem and is approaching it from a more practical standpoint. Certainly any research work done by a large municipality will be helpful to Philadelphia. Certain studies have already begun in Region II and we are reviewing results as they become available. The Interstate Sanitation Commission Report I referred to earlier indicates that land disposal of digested sludge

is not a feasible alternate for the New York area. The Commission Report recommends that pyrolysis and/or incineration be reviewed more closely for sludge disposal in the New York area. Region III's position, as well as many individuals participating in our appeal hearing in May of 1975, is that land disposal is a viable technique for Philadelphia. We also feel that land disposal has promise for the Philadelphia area. My point here is that information developed for other municipalities is valuable but certainly not directly transferable. We have reviewed and visited many sludge handling installations in the United States over the last several years including the Chicago and Blue Plains installations. We have adopted what we feel are the acceptable features of many of the experiments we have witnessed and included them in our Ten Point Program. Again, however, I must emphasize that success and failures of other municipalities are not directly transferable.

**Question 8.** You point out in your testimony that EPA seems to be implementing the ocean dumping law differently in different regions. Wouldn't it be preferable to impose the stricter standards on all municipalities rather than the looser standards?

**Response.** I feel that standards should be applied to the various municipalities in a uniform fashion. I also feel that the administration of the law should be more uniform between the various regions. The standards are the same for Region II and Region III; the administration is not. More of a burden is being placed upon the two and one-half million people in Philadelphia than the metropolitan New York citizenry. We have been asked in the past and present to do more regarding ocean research, to do more regarding analytical testing, to do more regarding alternate studies, and to pay more for transportation costs. Region II has a goal of phaseout by 1981, we have a mandate. The fundamental problem here is that ocean disposal is being ruled out before all the evidence is presented. Further a very cost-effective alternate is being taken away from municipalities with less evidence of environmental harm than in a similar situation for land disposal. I do not believe it is fair to impose stricter standards on all municipalities rather than looser standards if in fact there is no compelling reason. The impact of the Marine Protection Act should be assessed. After knowing the full impact on many of the eastern communities we should re-think the legislation position.

**Question 9.** In testimony we received last week, the representative from the State of Maryland stated that counties and cities in Maryland had been forced to halt ocean dumping, and at a great expense of money and effort, they phased out their dumping in less than one year. That witness went on to point out that Philadelphia could successfully phase out ocean dumping in a year and a half. He explained that Philadelphia only needed to commit itself and expend the money and effort. Now that Administrator Train has upheld the Regional Administrator's decision to phase out Philadelphia's dumping by 1981, does Philadelphia plan to expend that necessary effort and meet that deadline?

**Response.** The witness has misled your committee. The situation which the witness refers to is a Blue Plains case. Here vacuum filtered sludge was being disposed on land not in the ocean. Maryland never practised ocean disposal and therefore there was no 1½ year phaseout. There was a 1½ year period where disposal sites in and around Washington, D.C. were located and by court intervention used for land disposal. The two situations, Philadelphia vs. Blue Plains, could not be further apart. Philadelphia has no vacuum filtering capability as in the case of Blue Plains. Philadelphia also has no operating history where its sludge is land disposed. In order for Philadelphia to develop a filter cake for land disposal, three or four years of engineering and construction time would be required. In addition to this, available land sites would have to be obtained. Therefore, the witness is not correct when he states that we could successfully phaseout ocean dumping in 1½ years. Philadelphia of course has committed themselves to the phaseout schedule that appears in our present permit. Philadelphia has and will continue to allocate all the effort required to follow the phaseout schedule. In this next budget year we have requested an additional \$10 million for this work. This is above and beyond the money presently spent for sludge disposal. We feel that the phaseout schedule is an ambitious one and we will do our best to meet it. We hope that all our work in the final analysis will be judged necessary and vital to the protection of our total environment. Quite frankly I am not sure anyone will be able to measure the environmental benefits of this phaseout program.

CITY OF PHILADELPHIA,  
WATER DEPARTMENT,  
Philadelphia, Pa., February 5, 1976.

Congressman ROBERT L. LEGGETT,  
Chairman, Subcommittee on Fisheries and Wildlife Conservation and the Environment, Longworth House Office Building, Washington, D.C.

DEAR CONGRESSMAN LEGGETT: As you requested in your hearings January 29, 1976 I have enclosed a copy of Philadelphia's Ten Point Program. As I indicated at the hearings, this program is aimed at the phaseout schedule mandated by the Environmental Protection Agency. In order to implement this program, large capital and operating dollars must be committed by the City of Philadelphia. In addition to the points developed in the program, we do intend to research the potential of solar energy as a sludge dewatering mechanism.

Again, I would like to thank you for the opportunity of providing input to to these hearings. I feel it is important that your committee hears from those professionals in the field who have the vexing responsibility of implementing the Marine Protection, Research and Sanctuaries Act. I would hope in future hearings other individuals from communities impacted by this legislation could present their views. I am thinking particularly about public works officials in New York, Passaic Valley and other New Jersey communities who are presently ocean dumping. Combining their inputs with mine I feel will give you a better perspective of the financial impact that this legislation has or will have on metro areas on the east coast.

We have received from Congressman Murphy a list of questions which we are presently answering. This document will follow shortly.

Very truly yours,

CARMEN F. GUARINO,  
Water Commissioner.

Attachment.

#### SLUDGE DISPOSAL MASTER PLAN TEN-POINT PROGRAM INTRODUCTION

The ocean dumping abatement schedule prescribed by Special Condition 7(1) of Interim Permit PA No. 010 requires that a 50 percent reduction in the quantity of sludge barged to sea be accomplished by January 1, 1979, and that all ocean dumping by Philadelphia be ended by January 1, 1981. In order to comply with this schedule, the Water Department has essentially two options. First, a decision could be made immediately to implement full scale facilities for each or all Philadelphia treatment plants so that design, construction, and implementation could be accomplished within the required time limits. To follow this approach, a tested proven method for sludge disposal on a scale comparable to Philadelphia's needs would be required. Second, the Water Department could select a number of different methods, including methods that are promising but largely unproven in large scale applications, for implementation on a sufficient scale to meet the deadlines. This option provides additional flexibility and serves to minimize the negative impacts of false starts and failures, should they occur.

The Ten Point Program described in the following sections follows the second option just described. Ten distinct programs, aimed at reducing the quantity of sludge material going to sea, have been established. By 1981, it is hoped that all of these programs can be functioning on a sufficient scale to allow cessation of ocean dumping. Because a great deal of development work is needed for each method, it is the goal of the program to accomplish this development while ocean dumping is being ended and then have the data and information needed to choose a long term solution, or set of solutions, for Philadelphia.

The so-called Master Plan will ultimately be comprised of a set of detailed plans for each of the ten programs. At this time, and in this text, such detail is not yet available. The following discussions do, however, provide the basic framework and milestones necessary to successfully implement the program and comply with the permit requirements.

#### BACKGROUND—PARTS 1 AND 2 AND 3

The digested sludge produced at Philadelphia treatment facilities will be utilized to implement a distribution program aimed primarily towards making the beneficial, soil conditioning aspects of sludge solids available to the public. In

order for the public to realize these benefits, however, two important objectives must be met. First, the sludge must be processed into a uniform, aesthetically acceptable material, i.e., a solid cake with at least a 20 percent solids content. Second, an extensive advertising and public relations program must be mounted to illustrate the useful and advantageous characteristics of sludge solids. A significant portion of the solids processed at Southwest and Northeast is expected to be handled through the facilities and programs discussed in the following sections.

#### PART 1—GIVE AWAY PROGRAM

A temporary site is presently being prepared so that a give away program may begin at the earliest possible time. Due to the anticipated construction of Interstate 95 and the lack of existing, suitable land, the area designated will be in use for only a short period of time. The program will begin in the Spring of 1976 at the Southwest Water Pollution Control Plant. The temporary site is located on Water Department property immediately adjacent to Southwest "B" Lagoon. This area has been cleared and graded and will be covered with gravel or stone to provide parking and easy access.

Initially, sludge will be removed from B Lagoon by crane and placed along the outside edge of the dikes. A front end loader will transfer the material to an existing concrete pad for processing. Processing will consist mainly of daily turnings of the material to promote bacterial action (similar to composting) and uniformity. Once a uniform composition is achieved, the "finished" product will be placed in covered, cinderblock storage bins from which the public may take what they want. If sufficient interest is generated and bulk quantities are requested, the Water Department will schedule bulk loading days and load all trucks at no charge.

Because of severe limits on available land at the Northeast Plant, only tentative arrangements have been made. Sludge from B Lagoon at Northeast has been removed and placed in a small adjacent area felt, at this time, to be sufficient for processing. Public access to the area is still being considered and plans are not yet completed. Tentatively, however, the public will be entering the area through a gate situated behind the existing digesters and pick up material from bins like those planned for Southwest. The material distributed will consist of either Northeast "B" Lagoon processed sludge or processed material transported to Northeast from Southwest.

Prior to and during implementation of the Give Away Program, a series of news releases, articles, and announcements will describe the material being made available, recommend proper usage, and illustrate the benefits to be expected. The public information program will be coordinated through Mr. R. Harris, Public Relations Officer for the Water Department. The brochures, articles, and so on are now being prepared and should appear publically in January, 1976, in time for start up prior to the Spring planting season. An active information program will continue as more permanent facilities are developed.

As described, the Give Away Program will begin using lagooned sludge; and, therefore, no sludge can be diverted from the barge in the short run until cake production begins or the dredge operation at Southwest has begun (See Part 2).

#### PART 2—DEWATERING PROGRAM

The sludge cake needed for the distribution program will be generated by modifying the centrifuge station at Southwest to allow sufficient dewatering to be accomplished. Because this station was designed to only thicken sludge going to the barge, modifications, auxiliary equipment, and additional manpower are required to operate for cake production on even a limited basis. Centrifugation is capable of producing a sludge cake in excess of 20 percent solids. Plans call for modifying the station and operating on a trial basis until debugging is sufficient to allow production of a consistent quantity of acceptable sludge cake. It is expected that by the Summer of 1976, the centrifuge station can be operating at an approximate annual rate of 14 million pounds of dry solids. All of these solids will be processed and distributed through the Give Away Program or the Recycling Center (see Part 8).

Should demand for processed material exceed the operating capability of the centrifuge station, lagooned sludge can and will continue to be used. Because operation of a dredge at Southwest is planned to begin in January, 1976, the use of lagooned sludge in the Give Away should result in proportionate quan-

titles of sludge solids being diverted from the barge. Dredge operation, like that in use at Northeast's "D" Lagoon, achieves some dewatering through gravity thickening. The suitability of dredged material for use in the Give Away Program can only be determined by direct experience. The combination, however, of producing cake by the centrifuges and using dredged material to meet excess demand is expected to provide sufficient amounts of material for distribution. Further discussion of the use of the centrifuge station and the dredged material is contained in Part 8.

#### PART 3—RECYCLING CENTER PROGRAM

While the Give Away Program is being implemented via temporary facilities, preparations for a permanent installation at Southwest, which will involve both a Give Away Program and a composting operation, are underway. This area, tentatively titled the Southwest Recycling Center, will be located on Water Department property adjacent to the temporary site and out of the I-95 right-of-way. Because the land involved is presently cluttered with debris leftover from an abandoned car impoundment, a good deal of site preparation work is needed; consequently, the temporary location described in Part 1 is the only means of starting the Give Away Program in the short term. Plans and specifications for the complete Recycling Center will be prepared during the first half of 1976 so that construction contracts may be let at the beginning of fiscal year 1977 (July 1, 1977).

When completed, the Recycling Center will provide a large processing and distribution center, fully staffed and equipped. In addition, it will provide an area for trial use of a composting operation that it is hoped will improve the characteristics of the distributed material for land applications. Depending on the success of the initial phases of the Give Away Program, however, it is planned to continue processing sludge cake as described in Part 1 and distribute the additional composted material (if successful) in bulk to state and local agencies, parks, and other interested parties. The flexibility of coupling the Give Away Program and the composting operation in one facility is the prime advantage of the Recycling Center operation. Assuming success and good public response, the Recycling Center should be in full operation for the Spring and Summer of 1977. At that time, as much as 20 million dry pounds of sludge solids can be diverted through this operation each year if adequate public demand and other outlets can be developed.

Also located at the Recycling Center will be transfer stations for liquid sludge in use in the Liquid Sludge Application Programs discussed in Parts 4 and 5. Provisions will be made to use the dredge to directly load either tank trucks or railroad tank cars for long distance transport.

Again, assuming the success of the processing techniques and adequate demand for the material, it is planned to expand the Recycling Center Program to area-wide distribution centers. These area centers will bring the material into convenient locations and should greatly expand the population base from which demand originates. Establishing additional locations must, of course, follow an evaluation of the Southwest Recycling Center operation. A one year operating period for the Recycling Center is felt to be a minimum for accurate evaluation of the processing techniques and on-going public demand. Therefore, the area-wide distribution centers are planned for start up either in the Spring of 1978 or 1979, depending on the degree of public acceptance. Once begun, the Recycling Center will add to its functions that of a cake transfer station for supplying the area locations.

As area centers are established, preparations will proceed for expanding the centrifuge operation to produce more cake material. If all goes well, the expanded centrifuge facilities will be generating in excess of 25 million dry pounds of sludge solids per year in cake form. Dredged material will continue to be used to supply excessive demands and material for composting. Full use of the Recycling Center and area locations is planned for 1980.

#### BACKGROUND—PARTS 4 AND 5

The Water Department has been pursuing the concept of applying liquid (10 percent solids content) sludge to land for several years with the unsuccessful Letterkenny Demonstration Project and other simultaneous efforts toward securing applicable land areas. This, coupled with the apparent success of applying liquid sludge to land by other smaller communities, makes liquid sludge application a potentially successful method of utilization.



The rejection of the Letterkenny Program by local citizens was a disappointing setback, but it now appears that suitable land can be located in the near future. The subsequent use of these areas must be accomplished by a systematic, professional program that works to establish local acceptance at an early, grass-roots level and maximizes local benefits and, thereby, avoids a repetition of the Letterkenny problems. To that end, the Water Department plans to gradually implement its Liquid Sludge Application Program until such time as the concept and practice is commonly known and accepted.

#### PART 4—DEMONSTRATION PROGRAM FOR LIQUID SLUDGE APPLICATION

Acceptance by the public is one key factor in the success or failure of a large scale application program. Thus, in order to develop a receptive public opinion, the Liquid Application Program will be initiated on a 60 day trial basis as a demonstration of the concept in the area where larger scale work is anticipated. The first of these programs will be implemented in the Spring or Summer of 1976 on the land area felt to be the most promising for full scale work. In addition, a 60 day demonstration is planned for each year as part of the effort to secure additional land for future sludge application work. By this system of demonstration, followed by expanded operation (if the demonstration is successful), it is hoped that public awareness will be tempered by good examples easily visible to the local citizenry.

The demonstration package program will consist of applying up to 30,000 gallons of Southwest sludge per day for a 60 working day period. A Pennsylvania Department of Environmental Resources permit has been obtained for the first demonstration program. The project will allow for establishing initial contact with the area, determining the feasibility of operating on the site, assessing economic needs, and evaluated long term project viability in terms of environmental effects and financial costs.

#### PART 5—EXPANDED LIQUID SLUDGE APPLICATION PROGRAM

Following a successful demonstration project, the operation will be expanded to apply sludge on a regular basis. For the prime application site now under negotiation, the tentative application program will utilize 400 acres in fiscal year 1977, 1,000 acres in fiscal year 1978, 2,000 acres in fiscal year 1979, and 3,000 acres in fiscal year 1980 if no insurmountable difficulties are encountered either publically or environmentally. The application rate will be determined as prescribed in the EPA Technical Bulletin<sup>1</sup> but has been tentatively set at 12.5 dry tons per acre per year with an expected project life of 10 years. Land application on this scale would permit disposition of up to 75 million dry pounds of sludge solids on 3,000 acres of land each year of the full scale project. All parts of the expanded program will be publicized in advance and be regulated by updated PaDER permits. Monitoring needs will be determined and the necessary precautions taken.

As the first, or prime site, is being developed and implemented, a consecutive program of 60 day demonstration programs will continue and additional application sites will be secured. A goal of establishing approximately 500 acres of additional land each fiscal year (beginning in fiscal year 1978) has been established. If the goal can be maintained, access of new application sites will serve as a principal long term means of sludge solids utilization, at least for sludge from the Southwest facility.

The above plan is ambitious and assumes no major setbacks. Initial efforts may well determine long-term success and, thus, the first operating years will be critical. The Department's approach will be careful and require a great deal of planning and interagency cooperation. The complete support of EPA and PaDER is essential. As negotiations proceed and the location of sites is announced, all parties, including the local citizens, will be fully and accurately apprised of the program and constructive inputs will be welcomed.

A great deal of preparatory work has been completed for the Liquid Application Program but a greater amount remains. Permits and local approvals for the 60 day program at the prime site have been obtained. Scope and detail for the 60 day demonstration have been developed as have the requirements for the first (400 acre) full scale operation. Still being prepared are the necessary

<sup>1</sup> Because of the restrictive conditions in the draft EPA Technical Bulletin, the City is anxious to learn whether and when this Bulletin will be made available.

requirements contracts for equipment and manpower allocations. In addition, management contracts for the program must be prepared and let. Much of this work will be completed by the end of this fiscal year (1976) to coincide with funding scheduled to become available in fiscal year 1977. The on-going program will require continuous revision and advance planning as difficulties arise and are overcome.

#### BACKGROUND—PARTS 6 AND 7

During 1974 and 1975, work has been proceeding towards a research/demonstration program for acid wet oxidation of digested sludge. In December, 1974, a formal application for Federal funding was filed with the United States Environmental Protection Agency. The grant was awarded and accepted in May of 1975. Since that time, however, implementation of the program has been delayed due to circumstances beyond the control of the Water Department or the Environmental Protection Agency and all work on the project is still pending at this time.

The delays encountered are due to a possible corporate restructuring on the part of the Barber-Colman Company, the firm marketing the process. As it stands, now, Barber-Colman will not enter into any binding commitments (necessary for the program to go forward) until their planning process is complete. Therefore, all plans discussed in the following sections are entirely dependent on the willingness and ability of Barber-Colman to go forward.

More recently, the Water Department has been discussing the potentials of a pyrolysis system, also being marketed by Barber-Colman, specifically intended for use along with the wet oxidation system. Again, all discussion of plans regarding a Barber-Colman pyrolysis system are predicated on the same factors just discussed. The Water Department does intend, however, to conduct engineering studies on the applicability of pyrolysis for use in Philadelphia by investigating other systems.

It should be clearly stated that both the wet oxidation process and the pyrolysis process(es) are longer term, research-oriented efforts which will allow only a limited diversion of sludge from ocean disposal to the demonstration units during the next five years. As a long term solution, however, both concepts have large scale potential and, therefore, warrant continued investigation.

#### PART 6—PURETEC PROGRAM

Since grant funding is available, only two important steps are required to implement the program. First, a temporary facility must be constructed to house the equipment and all system parts must be installed. Second, a final program plan must be developed and contracts must be let to implement it. Construction of the facility is expected to begin in January, 1976, with completion estimated for July. During the construction period, the final program plan will be developed so that start up may proceed as soon as construction and installation is complete. Realistically, however, with contractor delays and debugging, start up is expected in the Fall of 1976.

The acid wet oxidation system (PURETEC is the Barber-Colman tradename for its process) employs high temperature and pressure to destroy the organics contained in digested sludge. Under acid conditions, heat exchanger scaling is avoided and heavy metals go into solution. This unique arrangement, which includes the production of considerable amounts of ammonia, make the effluent streams potentially amenable to by-product recovery. Anticipated recoverable by-products include fuel, metals, fertilizer, and heat.

The system designated for use at Northeast will receive 16 dry tons of solids per day for an initial 18 month operating period. During the initial phase, standard operating variables will be assessed. Following satisfactory demonstration of reliable performance, by-product recovery circuits will be added and evaluated for at least another 12 months. If successful, an evaluation of full-scale potential will be made and steps taken toward full implementation. Throughout the demonstration program, about 11 million pounds of sludge solids per year will be diverted from the barge.

#### PART 7—PYROLYSIS DEMONSTRATION PROGRAM

Pyrolysis is a system of destructive distillation of organic material at high temperature for the production of usable by-products. The Barber-Colman Company has developed and piloted a pyrolysis system using molten lead as the

"hearth." The system is designed to utilize refuse and the residue from wet oxidation to produce a fuel gas and generate power. Preliminary estimates indicate a power source capable of supplying the needs of the upgraded Northeast Plant. For this reason, the Water Department has had several discussions with Barber-Colman and the EPA about the possibility of a funded demonstration program to complete the development work begun by Barber-Colman. The Northeast Plant is ideally suited for such a program because of the planned wet oxidation program and the proximity to a ready source of municipal refuse.

Preliminary discussions indicate that a 50 dry ton per day (refuse) pyrolysis unit could be installed adjacent to the PURETEC Pilot Plant so that the systems approach can be investigated. Plans call for preparing and submitting a formal grant application to EPA by June of 1976. If the grant is awarded, the pyrolysis unit could be on line by January, 1978, for a two year demonstration program. Should this project become a reality, the PURETEC system would continue to process sludge but the residue would be diverted for pyrolysis. Indications are favorable at this time based on EPA preliminary response but much development is still required. The Water Department plans to actively pursue this systems approach.

Several other companies are beginning to market pyrolysis systems. Indeed, the Interstate Sanitation Commission Report for the New York Area recommends pyrolysis as the most promising alternate means of sludge disposal. For these reasons, the Water Department will conduct in-depth engineering studies of the major pyrolysis systems. This work will begin in the Winter of 1976 and preliminary results should be available by Summer.

#### BACKGROUND—PART 8

At the adjudicatory hearing held to consider the conditions of Interim Ocean Dumping Permit (No. PA 010), much discussion centered on the availability of strip mined areas needing reclamation and the success of Chicago's Prairie Plan using sludge on strip mined land. The Water Department had toured a large area in Northeastern Pennsylvania and noted the vast majority of mines as being very deep, thus requiring extensive land forming before reclamation could be considered.

Since that time, contracts for removal of sludge contained in Lagoons "A" and "B" at the Northeast Plant have been advertised and concept proposals received.<sup>2</sup> On the basis of our understanding of the concept proposals, it appears that an acceptable, available strip mined area can be secured so that a demonstration effort might begin early in fiscal year 1977. Initiation of such a project could provide a much needed starting point for developing the concept throughout the State. Steps may then be possible to phase in the use of currently generated sludge so that a long term, full scale success might result.

Meetings with PaDER have been established to discuss the possibilities of reclamation in various parts of the State. In any eventuality, the Strip Mine Reclamation Program will be actively pursued and developed during the next five years with the goal of establishing a large scale reclamation effort by 1981.

#### PART 9—STRIP MINE RECLAMATION PROGRAM

During fiscal year 1977, the Water Department hopes to establish a strip mine reclamation demonstration project in Pennsylvania using approximately 50 acres of strip mined land. The prime target area for the demonstration has been identified and a tentative application rate of 100 dry tons per acre (on a one-time, single application basis) is being considered. Extensive environmental monitoring and controls will be employed.

Many factors could hinder initiation of the program. For example, it may be necessary to challenge certain sections of Pennsylvania's Solid Waste Management Act if local approvals are withheld. Extensive public outcry, such as has occurred with similar programs involving refuse, could also delay the project, although careful efforts will be made to secure local acceptance.

Once begun, the demonstration program will be gradually expanded by adding approximately 50 acres of spoiled land for application during each of the project's years. This gradual enlargement of the initial program is aimed at minimizing public hostility that has occurred in past efforts involving mined land.

<sup>2</sup> These concepts have been reviewed by EPA Region III Construction Grants Division.

Assuming success in implementing a demonstration project in fiscal year 1977 and continued successful demonstration in fiscal years 1978 and 1979, preparations for large scale implementation will begin in fiscal year 1980. This will, it is hoped, involve 500 acres of spoiled land at the 100 dry ton per single acre application rate. Demonstration work will continue during implementation for research purposes. Implementation of large scale reclamation is planned for fiscal year 1981. Another 500 acres is expected to be utilized during each of the following years. This would allow disposition of up to 100 million dry pounds of sludge solids each year at full operation.

During the course of development and implementation of the Strip Mine Reclamation Program, an active public information campaign will be conducted in conjunction with an active program for securing additional spoiled areas suitable for sludge reclamation. Should both the application program and the public program be successful, a continuous full-scale reclamation effort can be accomplished.

#### PART 9—LANDFILL OPERATION PROGRAM

Development work is also being planned for the use of sludge in a sanitary landfill. Admittedly an alternative which is largely land destructive, a landfill does have the advantage of offering a rather quickly implemented disposal method should problems arise in other, more beneficial solutions. Therefore, the Water Department intends to secure a landfill site in fiscal year 1977 and to develop a utilization program. Because fewer local benefits (if, indeed, any at all) can be promised from landfill operations, public opposition in local areas may be intense, and careful planning will be necessary to locate suitable sites and to win local acceptance.

Landfilling has been in use for many years but only limited attention has been paid to the environmental and operational limitations. In order to properly control the environmental consequences of applying sludge in a sanitary landfill, the specific material must be utilized and studied. After securing a site and developing an operational program, the potential for large scale use of Philadelphia sludge will be evaluated, in coordination with other communities which are utilizing this method such as the Washington Metropolitan Area.

#### PART 10—DIGESTER IMPROVEMENT PROGRAM

The function of an anaerobic digester is to stabilize organics in sludge by destroying volatile solids and producing gas. If the volatile destruction in the digesters can be increased, then the amount of solids leaving the digesters and requiring disposal can be reduced.

Philadelphia has been studying, on a laboratory scale, the addition of powdered carbon to digesters to improve volatile solids reduction. These studies, while inconclusive at this point, will continue until some definition of potential can be made.

The acid test of the concept will come during the next fiscal year when a plant scale study will be implemented. In this study, one digester will be taken off line to allow for adaptation for adding carbon. The digester will then be placed back in service and operated, with carbon addition, to evaluate any improvement in performance. If successful and not prohibitively costly, carbon addition could result in a reduction of digested sludge quantities. A formal program is being finalized at this time.

[Whereupon, at 2:45 p.m., the subcommittees recessed, to reconvene at 10 a.m., Friday, January 30, 1976.]

## **OCEAN DUMPING**

**FRIDAY, FEBRUARY 27, 1976**

**HOUSE OF REPRESENTATIVES,  
COMMITTEE ON MERCHANT MARINE AND FISHERIES,  
SUBCOMMITTEE ON OCEANOGRAPHY AND THE  
SUBCOMMITTEE ON FISHERIES AND WILDLIFE  
CONSERVATION AND THE ENVIRONMENT,  
Washington, D.C.**

The subcommittees met, pursuant to call, at 9:40 a.m., in room 1334 Longworth House Office Building, Hon. John M. Murphy (chairman of the Subcommittee on Oceanography) presiding.

The subcommittees will please come to order.

This morning we resume our oversight and authorization hearings on the Ocean Dumping Act. From what we have heard during previous hearings, there are obviously some real problems in the implementation of this act.

We have heard from scientists and environmentalists who have been severely critical of the various agencies responsible for carrying out the provisions of the act. Criticisms range from serious allegations against the Environmental Protection Agency to inevitable squabbles with the Coast Guard at their inability to meet their internally set goals.

All of these criticisms trouble the committee, because I believe that when Congress mandates something, and the President signs it into law, the Federal bureaucracy should follow through on it. It should dedicate itself to seeing that the will of the people and the Congress is done.

In this case, the will of the people is to phase out all ocean dumping and to find, and employ beneficial alternatives for the vast amounts of sewage sludge and other wastes which are being generated.

In my own district, the New York Power Authority has planned to build a coal-fired generating station. It will produce 800,000 tons of sludge per year, and it will have to be dumped somewhere. That is just one powerplant in one district in America.

I am not at all satisfied that the agencies are pursuing these goals with due diligence.

Last month several criticisms were raised against the Environmental Protection Agency. Among them, it was charged that:

EPA's own regulations regarding safety levels of mercury and cadmium in waste materials are being constantly violated with EPA's knowledge and forbearance.

EPA's selection of a test organism for bioassays is totally inappropriate. They are testing the effects of the polluted water on a hardier organism than is even found in the area of the dump site. As a result, areas of the sea floor in the New York Bight have been found to be totally devoid of marine life.

EPA is lenient in granting permits, inconsistent in its policy of phasing out ocean dumping, and incomplete in its research efforts.

EPA was given a chance to respond to these allegations and was somewhat less than successful in defending itself. There remain severe doubts in my mind about the dedication of EPA to the goals set forth in this act.

Today we will hear from NOAA, the Army Corps of Engineers and the Coast Guard, and we will hear from Mayor Kelley of Ocean City, Md.

Hopefully, they will be able to present a stronger case than EPA did last month.

There have been questions about the efficacy of NOAA's research project and the adequacy of the cooperation between NOAA and EPA in this area of research.

There has also been considerable criticism of the Army Corps of Engineers, culminating in a lawsuit which is currently before the courts.

And the Coast Guard has been charged with a lack of diligence in their monitoring of ocean dumping activities. We heard last month of a case in which 28 violations were observed by a research vessel in a 12-hour period in the New York Bight.

All of these allegations must be carefully examined as we conduct our oversight responsibilities today. I hope the agency representatives can answer some of the questions we have for them today.

Next Friday, this subcommittee will be going to New York City to continue its oversight function. At the hearing next week we will focus on the problems of the New York Bight, which is easily the most heavily dumped coastal region in the United States. We are anxious to hear from the officials directly involved in the activities up in New York and hear about the programs and the problems being encountered there where the area of shellfish contamination has actually increased since the passage of the Marine Protection, Research, and Sanctuaries Act of 1972.

I point out for the record that just yesterday, New York State's Environmental Conservation Commissioner issued a warning that PCB's (polychlorinated biphenyl) in the Hudson River pose a danger and prohibited nearly all commercial fishing in its waters, and that is bad for those people who like Hudson River shad. It happens to be the season right now.

We are happy to have as our first witness Mr. Robert W. Knecht, Assistant Administrator for Coastal Zone Management, National Oceanic and Atmospheric Administration, who will be accompanied by Dr. Donald P. Martineau, Deputy Associate Administrator for Marine Resources, NOAA.

Mr. Knecht, you may proceed.

**STATEMENT OF ROBERT W. KNECHT, ASSISTANT ADMINISTRATOR  
FOR COASTAL ZONE MANAGEMENT; ACCOMPANIED BY DR.  
DONALD P. MARTINEAU, DEPUTY ASSOCIATE ADMINISTRATOR  
FOR MARINE RESOURCES, NATIONAL OCEANIC AND ATMOS-  
PHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE**

Mr. KNECHT. Thank you, Mr. Chairman.

Mr. Chairman, I have a prepared statement, a brief one, that I would like to read and then be happy to answer questions.

Mr. MURPHY. Please proceed.

Mr. KNECHT. Thank you.

Mr. Chairman and members of the subcommittees, I appreciate having this opportunity to appear before you to discuss the National Oceanic and Atmospheric Administration's [NOAA] marine sanctuaries activities under the Marine Protection, Research, and Sanctuaries Act of 1972. Congress, through this legislation, has assigned to the Department of Commerce and NOAA important responsibilities for the designation and management of selected key marine environments. I would like to describe for you the progress we have made to this date in implementing title III of the act. Dr. Martineau of NOAA will follow me and address those responsibilities under title II.

The initial step taken to carry out the requirements of title III was the delegation of managerial responsibilities to NOAA, within which staff functions were assigned to the Office of Coastal Zone Management—thus uniting this program with collateral responsibilities for estuarine sanctuaries found under the Coastal Zone Management Act of 1972. My office is responsible for both title III of the marine sanctuaries program and the estuarine programs of the Coastal Zone Management Act.

NOAA believes the Coastal Zone Management Act, the Marine Protection, Research, and Sanctuaries Act, the Marine Mammal Protection Act, the Endangered Species Act, and other pieces of legislation related thereto amount to a substantial body of law spelling out a major national environmental obligation.

We believe the marine sanctuary title of the Marine Protection, Research, and Sanctuaries Act is a significant part of this total obligation and is an opportunity to provide for balanced, well-managed, environmentally sound use of the Nation's marine resources.

Administrative costs have been assumed by the coastal zone management program, and within existing resources NOAA has developed a basic policy framework with which to manage the marine sanctuaries program.

Three reports to Congress, which have been supplied for the hearing record, outline the program development aspects. In addition to laying the program foundation, two marine sanctuaries have been established.

The Nation's first marine sanctuary, established to protect the Civil War ironclad—*Monitor*—was reported on at last year's hearings. I have for the committee a copy of the official designation document.

We have a continuing responsibility for *Monitor*. Two applications for research permits have been received and denied, by my office, due to a lack of sufficient information in the applications.

The Smithsonian Institution hosted a conference on the *Monitor* this past January 15 and 16 to explore such questions as: whether the ultimate purpose of research should be recovery of the vessel; which scientific tests should be met before recovery efforts were attempted; what process should be followed in recovery programs; and how to develop a master plan for recovery, if indeed this is decided to be undertaken.

The conference also discussed the advantages and disadvantages of such a master plan from the historical, archaeological, scientific, and conservation points of view.

Such conferences give guidance to NOAA in administering the permits program and help us develop a program whereby a maximum number of citizens will be able to enjoy the vessel.

We have had excellent cooperation from the Navy, Smithsonian, Department of Interior, Coast Guard, the State of North Carolina and the National Trust for Historic Preservation in all aspects of managing this first sanctuary.

Unlike the *Monitor*, a coral reef is a living thing. On December 18, 1975, Dr. Robert M. White, substituting for Secretary Morton, designated the Key Largo Coral Reef Marine Sanctuary. This was the second marine sanctuary to be designated. Dr. White was assisted in the ceremony by Assistant Secretary Nathaniel Reed of the Department of Interior and Mr. John Pennekamp, a long-time advocate for protection of the area. I have copies of both the program and the designation document for your records. NOAA believes the Key Largo designation was a significant milestone since it is our Nation's first marine sanctuary for ecological, recreational, and esthetic purposes.

The State of Florida has primary management responsibility, under terms of a contract with NOAA, and will be assisted in law enforcement by the Coast Guard and the Department of Justice. The rules and regulations developed provide for protection of the area while maintaining certain preexisting uses, notably those concerned with recreation.

Where do we go from here?

The two existing sanctuaries require continual management effort. The *Monitor* sanctuary requirements are not great, however, since on site continuous surveillance is not required due to its inaccessibility, especially during periods of hostile weather. Anticipated field activities will be seasonal due to these hostile weather conditions off Cape Hatteras most of the year. The Key Largo Coral Reef Marine Sanctuary, on the other hand, encompasses 100 square miles and will be visited by as many as 300,000 visitors a year. Surveillance of the area is a large task, and will no doubt strain the limited resources available to us in this program.

In the near future, we intend to begin work on the development of a comprehensive programmatic framework for the marine sanctuaries program as a whole. Such a framework will be useful in ascertaining the merits of unsolicited nominations as well as directing



a federally initiated program. One concept likely to be included is the idea of extending the boundaries of existing natural areas established by the Department of the Interior—such as wildlife refuges and national seashores—into the marine environment. The excellent cooperation given by Assistant Secretary Reed in establishing the Key Largo Coral Reef Marine Sanctuary encourages NOAA to believe this idea may become a workable use of our authority under the act.

This concludes my prepared testimony. I shall be happy to answer any questions at this time.

Mr. MURPHY. We will take Dr. Martineau's testimony, and then we will begin questioning.

Dr. Martineau, you can summarize your statement, or go through it in its entirety, but if you summarize it, without objection the entire statement will be printed in the record at this point.

Mr. MARTINEAU. I will try to move through it rather rapidly, Mr. Chairman.

My statement today will consist of two parts; the first part is a review of various research efforts that have been carried out in response to the legislation, and the second part outlines recommendations concerning future research under title II. We hope it will be useful to your subcommittee in its deliberations on oversight and authorization.

Title II specifically addresses the need to carry out investigations in three separate but yet related areas. Briefly states, these are: (1) Programs under section 201 to investigate the short-term effects of ocean dumping upon the marine ecosystem; (2) programs under section 202 to assess the possible long-range effects of ocean pollution, overfishing, and other man-induced stresses on marine ecosystems; and (3) assistance under section 203 to research activities exploring alternatives to disposal by dumping at sea.

I would like now to briefly summarize for you the major activities carried out by NOAA in response to each of these three areas.

Under section 201 of title II we are required to initiate a comprehensive and continuing program of monitoring and research on the effects of ocean dumping. Our interpretation of this mandate is that monitoring and research activities should be designed to support and complement the regulatory programs established pursuant to title I of the act and to meet NOAA's responsibilities under other legislation, such as the Fish and Wildlife Coordination Act, the National Environmental Policy Act, and others.

The proper implementation of the ocean dumping permit system requires a continuous program of monitoring the effects of ocean dumping. Consequently, NOAA has initiated a program of dumpsite characterizations to be followed by monitoring activities at individual dump sites located on the Atlantic, gulf, and Pacific coasts. This program is being closely coordinated to support the regulatory programs carried out by EPA. The actual sites to be characterized and monitored are identified by EPA.

As we advised the committee last year, Mr. Chairman, we have concluded with EPA an interagency agreement concerning baseline surveys and evaluations of ocean disposal sites, under the Marine Protection, Research, and Sanctuaries Act.

The dumpsite characterization and monitoring programs which we are carrying out are designed to provide EPA with information to assist their regulatory and management programs with regard to decisions such as the location of new dump sites, and will assist in the evaluation of the environmental consequences and effectiveness of ocean dumping controls.

The primary objectives of these studies are to: (a) Determine and describe the basic physical, chemical, biological, and geological characteristics and their patterns of variation that characterize environmental conditions in the area; (b) conduct selected experiments on the fate and pathways of dumped materials, their transfer mechanisms within the ecosystem, and on specific effects of dumped material; and finally (c) develop the methods and procedures for monitoring critical indicators of the conditions of the dump site environment and changes thereto.

Funds are being sought from the Congress in fiscal year 1977 to expand the cooperative EPA/NOAA dump site characterization and monitoring efforts beyond the present three locations now being studied by NOAA.

A detailed evaluation of two alternative dump site areas at the edge of the Continental Shelf in the New York Bight area already has been carried out for EPA to determine the environmental trade-offs involved in the event EPA must move the existing dump site in the area to one of the alternative locations. During the past year a report of the evaluation of these sites was prepared.

I have a copy, if the committee does not.

I have a copy today for your New York hearings next week, but we can make others available.

Mr. MURPHY. We will need about 10 copies.

Dr. MARTINEAU. We will certainly see that they are available.

Since 1974, a series of seasonal investigations also have been made at Deepwater Dumpsite 106 located 90 nautical miles east of Cape Henlopen, Del. This site is used by more than 25 dumpers in the New York-New Jersey area to dispose of acid waste and industrial chemicals and is, therefore, of high priority to EPA for the evaluation of dumping impact. This year's work now underway will complete the characterization of the dump site, after which NOAA will provide recommendations to EPA on continued use of this site.

Again, Mr. Chairman, we have available here with us a document to describe the nature of this work. It is a report of one of our operations, where we are taking seasonal assessments, and we can make it available to the committee, to provide further information on the types of activities we carry out.

While work is proceeding at individual dump sites and EPA and NOAA are cooperating in the development of a program of site characterizations, the most significant efforts by NOAA on the effects of ocean dumping have been part of the MESA New York Bight project, initiated in fiscal year 1974.

As we have noted previously to the subcommittee, the New York Bight is the area of the Nation's most intensive municipal and industrial waste dumping. Although the long-term focus of MESA is on large-scale ecosystems studies and the development of research

and monitoring techniques, the initial MESA effort in the New York Bight was directed toward the problem of ocean dumping.

This work included the characterization of dump sites, in order to help meet the most immediate needs of EPA in managing ocean dumping. The project has been intensively studying the impact of present dumping activities, projected consequences of increased dumping at present sites, and the impact of present and projected practices at possible alternative sites.

This MESA research on ocean dumping is nearing an end. At the conclusion of the ocean dumping investigations by the MESA New York Bight program, we will have completed major objectives in:

(a) Establishing the information and the basis for sound management decisions in the New York Bight considering ocean dumping problems,

(b) Providing the scientific rationale for EPA decisions affecting the existing sewage sludge site, as well as alternatives for possible relocation,

(c) Developing a comprehensive strategy for the monitoring of future changes to environmental quality due to dumping, and

(d) Establishing preliminary relationships of dumped materials to other pollutants entering the bight from diverse sources in terms of overall pollution load and pressures.

I believe, Mr. Chairman, the committee has received the latest report of the MESA-New York Bight project, regarding ocean dumping.

We have one that is now in preparation, and we will see that the committee gets the latest version when it is prepared.

It is important to note that this project is providing a focus for the scientific investigations of other Federal and State agencies concerned with the area.

In addition, it has demonstrated the applicability of an array of technology from man-in-the-sea to satellites to address ocean dumping problems.

Not only are the results from this project applicable to the New York Bight, but in many instances they are transferable to similar problems in other areas. It is upon the experience being derived from the MESA project that we are developing the program of dump-site characterization with EPA.

It should be noted that while NOAA does not have a major cooperative effort with the Corps of Engineers, the marine ecosystems analysis (MESA) project in the New York Bight has developed information regarding conditions at the dredge spoil dump site off New York.

In addition, other individual activities within NOAA are being conducted in support of the scientific objectives of the Corps of Engineers dredged material research program.

Within NOAA there also are other ongoing research efforts which, although developed in response to other legislation, have direct applicability to ocean dumping research needs under Public Law 92-532.

The sea grant program, in particular, has been sponsoring projects concerned with such problems. An example of the sea grant

effort is the Texas A. & M. study of the history of ocean dumping in the Gulf of Mexico which concludes that with the advent of ocean incineration and the development of more efficient waste disposal alternatives, ocean disposal could conceivably be significantly reduced in the Gulf of Mexico. Such work done within the sea grant program has enlarged the scope of the NOAA effort both geographically and topically.

As for research on the long-range effects of man's activities on ocean ecosystems, the responsibilities assigned to the Department of Commerce in section 202 are extremely broad.

It is our understanding that the intent was for a single agency to ensure that the Federal research efforts are adequate as well as being coordinated in order to minimize duplication.

Therefore, we have interpreted our role primarily as one of coordination, as represented by our series of annual reports to the Congress which summarize the large number of federally sponsored research activities now underway.

Since the last time we appeared before your committee, there has been another report to the Congress, which I believe your staff has, and if they do not, we will make it available to them.

We are pleased to note the many federally sponsored efforts which address the various aspects of man's activities affecting the oceans.

We are pleased to note the many federally sponsored efforts which address the various aspects of man's activities affecting the oceans.

Our agency has been specifically involved in the study of petroleum and heavy metals on the marine environment, the assessment of our fisheries resources and international negotiations to reduce overfishing, and the assessment of OCS oil and gas development and deep-ocean mining.

While details of these programs are contained in the second annual report to the Congress on ocean pollution, overfishing, and offshore development, I would like to mention briefly for you several of the programs in which NOAA is actively involved in assessing the potential long-range effects of man's activities.

This includes our work in the Alaskan OCS area for the Bureau of Land Management, where we are responsible for the management of the environmental assessment program in that area.

We are active in deep-ocean mining environmental assessments. We have our deep-ocean mining environmental studies project called DOMES. We are in the first phase of the subject which is characterizing representative mining sites in the Pacific.

The second phase is working with the mining industry, when they do mining with prototype systems on the seabed.

Mr. MURPHY. The committee has already been on the Gulf of Alaska and reviewed that data, as far as Continental Shelf oil and gas is concerned, and we will be marking up a deep-ocean mining bill taking cognizance of the DOMES report at that time in March.

Dr. MARTINEAU. Yes, sir, I understand. In the area of fishing, we have been active in studies of overfishing, particularly in the North Atlantic, particularly reducing the pressures in that area so the stocks can be conserved. We have been involved in a number of international activities, in particular the recent negotiations in the

International Commission for the Northwest-Atlantic Fisheries (ICNAF) have been successful with respect to stocks inhabiting water adjacent to New England and the Middle Atlantic States.

The new ICNAF overall agreed-upon quota will allow recovery of Northwest Atlantic depleted stocks. However, it will require about 7 years at the established quota levels.

Other negotiations in 1975 with Japan and the USSR also will facilitate stock conservation of halibut and to a lesser extent, pollock, in the East Bering Sea and Pacific Ocean as well as perch in the Northeast Pacific.

In addition, at the 1974 International Commission for the Conservation of Atlantic Tunas (ICCAT) meeting, two U.S. proposals to regulate Atlantic bluefin tuna were adopted and in 1975 the United States enacted the Atlantic Tunas Conservation Act implementing the ICCAT convention.

These are but some of the major efforts that have been made toward protecting overfished stocks in the international area. The results from these efforts, however, will require several years to evaluate and to determine the rapidity with which the stocks are being restored.

We have also taken an active role in international marine environmental research programs which are designed to gather data on the background levels of pollutants in the oceans. The programs of particular interest to us include:

The Integrated Global Ocean Station System [IGOSS] and Global Investigation of Pollution in the Marine Environment [GIPME] programs of the International Oceanographic Commission as well as the contaminant baselines surveys in the North Atlantic being coordinated by the International Council for the Exploration of the Sea [ICES].

The final area of responsibility for the Department of Commerce under title II provides for supporting research on alternative methods of waste disposal. The development of the technologies involved in such alternative methods basically is outside of NOAA's background, mission, and competence.

A large number of research efforts, however, is being sponsored by other Federal agencies that address this issue. In order to be able to take responsible positions with respect to ocean disposal policies and to be able to effectively advocate these alternatives, as appropriate, NOAA has maintained a close awareness of the research and technology in the area of alternative waste disposal methods.

For the Department of Commerce to build a capability to develop alternative waste disposal methods to ocean dumping would involve duplication of existing scientific and technical resources and programs.

Consequently, we have placed priority on the earlier described studies to determine the environmental effects on ocean dumping and have deferred to EPA for the primary responsibility for the development of alternatives to ocean dumping.

Overall, Mr. Chairman, significant progress, we feel, has been made since the enactment of Public Law 92-582 in 1972, considering the magnitude of the problem with the complexity of the ecological systems involved and the geographic diversity of the areas.

In spite of this progress, however, there is a further need to continue the study of the effects of dumping at the various dump sites along our coastline. We believe it is necessary that the joint NOAA-EPA ocean dumpsite characterization program be implemented and continue the work begun by MESA.

As the Federal agency responsible for our Nation's living marine resources, we are particularly cognizant of the need to protect the quality of the habitat of these resources. Consequently, it is our desire that all harmful dumping be terminated as soon as possible.

Recognizing that alternative methods of waste disposal must be available before dumping can be terminated, we support the continuation of title II for the purpose of assessing the effects of dumping, particularly in areas other than the New York Bight. From such assessments can be derived the management decisions that will be necessary for the modification or termination of dumping.

Regarding section 202, title II, we believe that it is extremely important for our Nation and the world at large to assess the long-range effects of man's activities on the marine environment.

With the astonishing growth of our activities which potentially can impact the marine environment, as evidenced by our energy-related activities, it is increasingly essential that they be systematically assessed.

Consequently, we urge the continuation of our responsibilities under section 202.

Mr. Chairman, this completes my statement. I would be pleased to answer any questions you or your colleagues may have.

Thank you.

Mr. MURPHY. Thank you, Dr. Martineau.

Mr. Knecht, is title III more important today than when the bill was initially passed?

Mr. KNECHT. Mr. Chairman, I would say it is dramatically more important today than it was in 1972 when the bill was passed. Dr. Martineau referred to increasing pressures on the marine environment. One may think of just three.

It appears very likely that we are about to extend our control over the economic resources of the oceans that border the United States out to 200 miles. As you know, Congress is well advanced in taking that step. This will bring under the purview of the United States a vast amount of additional ocean, and the resources contained therein. Marine mining is under active consideration, and will not only involve manganese nodules, but sand and gravel as well. Third, energy pressures have increased dramatically, and many of them are focused on the shore land.

These together are development-extraction-exploitation activities. It is timely, perhaps even overdue, that we put as much attention on the other side of that equation, that is to begin to set aside areas for conservation, protection, and long-term use for other purposes, such as recreation, research, esthetic enjoyment. As we move to develop our ocean coastal resources we have to make a similar move to study, select, and designate those areas that need conservation and protection. I think the act is more important today by a long shot than it was in 1972, Mr. Chairman.

Mr. MURPHY. In 1969, with the assistance of the Corps of Engineers, I invited a group of scientists from the Sandy Hook Laboratory, to go out to the New York Bight area with me.

This was right after some rather revealing fish fin deterioration studies had been done. Upon reaching the bight area, he dropped a bucket down and picked up what was on the bottom. It was less than attractive residue, and the depth of the area was something we could not determine at that time.

While the passage of this act was in 1972, it is now 1976, and the 1977 budget is being formulated, yet we find that this bight is expanding, and any shellfish and shrimp that existed in that area are now gone.

Now, going 6 miles off the Long Island coast, the problem seems to be getting worse rather than better, in spite of the activity taken in this field in that one dumping area.

Mr. KNECHT. I think, Mr. Chairman, Dr. Martineau is in a better position to comment than I am because this subject falls within the area of his testimony.

Dr. MARTINEAU. As to the specifics regarding the degree of deterioration, I would defer to Dr. Swanson, or I should say Commander Swanson, who is from our MESA project, to give you more particulars.

There is an increased pressure on the amount of dumping that is taking place. We know more, because of the MESA program, about the effect, and I think working with EPA they are able now to make better decisions as to what the stress is for the dumping in that area.

It is also my understanding from discussions with Dr. Swanson that the total stress in that area is not due to dumping.

We are looking at what is the major pollution balance of the bight. That is what our study, we hope, will be able to give better information on, and I believe next Friday when you are in New York, he will expand on his testimony in that subject.

Mr. MURPHY. Have you found that the bight is a rather imprecise location?

When we see a little tick mark on a map, I found that one of the practices was for these large sewage barges and the like to start discharging as they were being towed out to the bight area, and it was not until we transferred the surveillance to the Coast Guard that they actually started to dump in the bight itself.

Perhaps this is the reason the bight is increasing, and starting to expand.

Dr. MARTINEAU. Mr. Chairman, when we testified earlier, before the Science and Technology Committee, there was a concern of what was the definition of the bight.

I have a map, if I might show you, and leave it with the committee. Our definition of the New York Bight runs from the tip of Long Island seaward to the Continental Shelf, and it goes as far as Cape May to the Shelf.

If you are talking about the apex of the bight, as where the dump sites are, I think it is worthwhile that the people define what they are talking about when they say "New York Bight."

Our New York Bight MESA study is a large initial study. Our ocean dumping aspects of it are predominantly focused in the apex of the bight, which is a much smaller area, and we can leave this map if you would like to see it.

Mr. MURPHY. I would appreciate that.

Mr. Knecht, what is the procedure for designating an area as a marine sanctuary? Is that process initiated by the States, by citizens, or by the Department of Commerce?

Mr. KNECHT. Title II of the Ocean Dumping Act, Mr. Chairman, indicates that the nominations can be initiated by anyone: a private citizen who recognizes a problem, an organization, local government, State government, Congressmen, and Federal agencies. The nomination is received in the Commerce Department, in our office, and we have a set of procedures used to process the nominations. Quite a range of nominations have been received, so far, from a variety of groups.

Mr. MURPHY. Since the act was passed in 1972, Congress has authorized a total of \$36 million over 4 years, and the Department of Commerce has never asked for any of that money for the purposes of title III, preferring to use the staff of the Office of Coastal Zone Management, and occasionally funds from the Office of the Secretary.

Would the program, in your opinion, be operated any differently if funds were appropriated specifically for the purposes of title III?

For instance, would we have more than just two marine sanctuaries today?

Mr. KNECHT. Yes, I would have to answer that in the affirmative, Mr. Chairman. The activity we have been able to carry on in the Marine Sanctuaries area has been limited because of the lack of specifically appropriated funds. The decision not to request funds was made by the administration.

Mr. MURPHY. By the administration, do you mean the Office of Management and Budget?

Mr. KNECHT. That is correct. Because of the fiscal stringencies that the administration has had to face, it was a question of setting priorities. Mr. Chairman, the point of your question is quite correct. Our program activity has been limited to slightly more than 1 man-year of effort per year.

I think where the effort has suffered has been in the area of developing a management program framework. Without such a framework, we have not been able to apply the device as aggressively as perhaps the Congress intended, and as I feel the problems now require.

Mr. MURPHY. Well, we would probably have more than two marine sanctuaries had we had some direction and funding for the title III amendments.

Mr. KNECHT. That is a bit speculative and it is difficult to know. I think, had we laid out a framework and pointed out opportunities to the various user groups or interested people for the kinds of objectives that might be achieved using the marine sanctuary device, I am sure there would have been greater response with more people proposing and nominating potential sanctuaries.



It is a lengthy process; the nomination, the research, the development of required environmental impact statements, the public hearings, and so on. Time is taken in this regard, but I think I agree with your general point.

Mr. MURPHY. Mr. Sarbanes?

Mr. SARBANES. Mr. Martineau, do you have planned any other dumping site studies, other than the three you have mentioned? These are only the ones on which you have carried out studies, is that correct,

Dr. MARTINEAU. Those are the only ones. We have plans underway for additional sites that will be contingent upon our fiscal year 1977 budget.

Mr. SARBANES. Where are those sites?

Dr. MARTINEAU. They are likely to be off Galveston, Tex., off New Orleans, and possibly Puerto Rico.

These sites are determined with EPA, on relative priorities, between our two agencies, but at the moment we are tentatively talking about those areas.

Mr. SARBANES. On pages 4 and 5 you talk about this dumping off Cape Henlopen, Del., a massive waste of industrial chemicals.

What happens to those toxic chemicals dumped there, do you now?

Dr. MARTINEAU. Not at this time. We know they are dispersed.

Our program is predominantly now to look at what are their fates as they move through the ecosystem. Our first phase has been more to describe the site itself.

Our next phase is to determine what their fate is, and what pathways they take.

We have not gone that far yet on that subject.

Mr. SARBANES. So you do not know where they end up in the ecosystem, what sort of impact they have in that regard?

Dr. MARTINEAU. At this moment we do not.

Mr. SARBANES. When do you expect to know?

Dr. MARTINEAU. Our study of that area in 1977, when we have the conclusion of the seasonal characterizations of the area, and have done the additional studies on the fates, which I think will take about another year or 18 months.

Mr. SARBANES. Have you looked at any site before there was any significant dumping, and in effect, done a baseline assessment of it, and then been in a position to come back with a comparative judgment after dumping took place?

Have you one that kind of study anywhere?

Dr. MARTINEAU. No; the only preliminary study we have made, to my knowledge, was for the potential alternative dump sites in the New York area, but they have not been designated as yet by EPA.

There we went into two areas that were selected as potential dump sites, but they are the only areas that have been preselected and we would be able to follow through if dumping were allowed.

Mr. SARBANES. Did you make any recommendations to EPA with regard to that matter?

Dr. MARTINEAU. We did two things with regard to that matter.

First, we carried out the assessment—the evaluation to which I have referred.

We then, as an agency, independently submitted recommendations to EPA as to whether or not the site should be moved.

Mr. SARBANES. What was the recommendation?

Dr. MARTINEAU. Our recommendation was that it not be moved at this time.

Mr. SARBANES. Why?

Dr. MARTINEAU. Because we felt that it would cause deterioration of another area.

At this time, the dumping loads they are carrying in the present dumping area would not, we feel, cause a health hazard that we know of, and on the assessment by our scientists, we prefer as long as you have areas that have been impacted, you should limit dumping to those areas and continue to use them at this time.

Mr. SARBANES. Now, I am concerned given your responsibilities, to protect the marine environment, by your statement with respect to section 203, that you are not doing anything now on research activities for alternatives to disposal by dumping.

Dr. MARTINEAU. That is correct. We have no capability.

We would have to build a capability to do that. The technical and scientific area is beyond what we now possess as an agency.

Mr. SARBANES. Who has the capability?

Dr. MARTINEAU. EPA.

Mr. SARBANES. What are you doing to pressure EPA on that subject, if anything?

Dr. MARTINEAU. Well, we meet with them. We go over their programs, and their section 203 activities are included in our annual report.

Also, in the New York area, we are aware of the work they have been doing with the Interstate Sanitation Commission.

Mr. SARBANES. On page 13 you say as the Federal agency responsible for our Nation's living marine resources, you are particularly cognizant of the need that we have to protect the quality of the habitat of these resources.

Consequently, it is our desire that all harmful dumping be terminated as soon as possible.

I really want to know what you are doing to carry out that desire.

Dr. MARTINEAU. In that area we are working with EPA, separate from this act, because of our responsibilities under the Fish and Wildlife Coordination Act.

We comment on the permits that are put out for review and we make our recommendations with regard to the marine resources.

Mr. SARBANES. Do you believe that ocean dumping should be allowed at all as a projected objective?

Dr. MARTINEAU. I think that is a very general statement. I think it would have to be qualified.

It may be possible under some circumstances to permit it.

Mr. SARBANES. Now, if you are going to permit it, how are you going to determine who is entitled to dump?

It is the cheapest way of disposal, and certainly industrial and municipal users would like to use ocean dumping. They would all like to use it.

How will you determine who is going to be entitled to go in and use the ocean for dumping purposes?

Dr. MARTINEAU. I am afraid in that area I would defer to EPA.

Mr. SARBANES. Well, we asked EPA that question, and they did not have an answer to it.

Dr. MARTINEAU. I do not think there is a simple answer.

Mr. SARBANES. Of course there is not, but if you open up the door everyone wants to pass through it.

The best answer may be to shut the door entirely.

What is NOAA's objective in this area, or what is NOAA's thinking?

Dr. MARTINEAU. NOAA's thinking is that if the dumping material, or the act of dumping is harmful to that environment, and will be a serious detriment to the habitat, then it should cease.

Mr. SARBANES. But you would allow dumping up to that point?

Dr. MARTINEAU. I think that is a rather specific criterion that you would say for the preservation of the habitat, that is a standard on them, and I think that would be a difficulty for many activities to meet.

Mr. SARBANES. Well, let me give you an example.

Philadelphia and Camden are dumping their sludge into the Atlantic off of Maryland's coast. They like to do that because it is cheap.

If they had to develop alternative disposal that would cost them some extra money, and every municipality would like to take the cheapest way out.

Now, are you going to, in effect, allow them to continue to do that and use the cheap way, and if so, why should not others be allowed to do it as well?

How are you going to make that determination?

Dr. MARTINEAU. I think that EPA makes that determination on the impact and the stress they place on the environment, and what the effect of that is upon either the living resources, the bottom, or the water quality.

Mr. SARBANES. Well, I am interested in what kind of pressure you are putting on EPA in that regard.

You have accepted the responsibility for our Nation's living marine resources, and the responsibility for protecting the quality of the habitat of those resources.

What is NOAA's objective with respect to ocean dumping?

Dr. MARTINEAU. Our overall objective is for the cessation of harmful pollutants being dumped into the ocean that will degrade the environment.

Mr. SARBANES. Well, how do you define "harmful?" That is your phrase, not mine, and that is why I am asking the question.

Dr. MARTINEAU. I feel that if it will have a health hazard, or if it will deteriorate the quality of the water, then I would put it in that category.

Mr. SARBANES. Suppose you are dumping something, and you only dump a small amount of it which can be absorbed, or at least that is the contention?

If you dump a large amount, it will clearly be harmful. You then have dumpers who come to you and say well, we want to dump a small amount which can be absorbed, and let us do it.

Now, why should they be allowed to do it at all if everyone were to do it, it would, in fact, degrade the marine environment?

Dr. MARTINEAU. Well, in the management of that, I think one would have to make these decisions, more than just the ocean dumping.

I would defer to EPA for the actual management decision processes they would make as to who would have that right, or not have that right, or how.

What we are concerned with is scientifically what is the load that could be taken in an area before they make their decision, that there is harm, or it should cease, but the actual management, I think, goes far beyond the ocean, per se.

I am sure there are other factors that EPA considers, but we are not participating in those decisions.

Mr. SARBANES. EPA testified that there were disposal methods far better from an environmental point of view, but they cost more money, and require more will to put into effect.

Mr. MURPHY. Would the gentleman yield at that point?

Mr. SARBANES. Certainly.

Mr. MURPHY. How would the city of New York dispose of its primary treatment sludge in any other way than ocean dumping?

Mr. SARBANES. Well, I would suggest they have got to be pushed to develop another system. They had to dispose of it at the Blue Plains treatment plant here. They were dumping it into the water, and the court order came in and said you cannot do that, that you have to develop an alternative method within 1 year, or 18 months, and they developed alternative methods, at some expense, and a good deal of turmoil.

At least now they are providing for it in a way that environmentally is significantly better than what was taking place theretofore.

What I am concerned about is their long run projections apparently assume continued ocean dumping.

How do you decide that Philadelphia and Camden are going to be allowed to dump, and Wilmington and Atlantic City are not going to be allowed to dump, and Maryland is going to have to build facilities to treat, and develop other disposal methods.

Mr. MURPHY. When we passed the act in 1972, we examined the eastern seaboard, and we saw the hundreds and hundreds of dumping sites offshore, but the New York Bight is more significant because of the tremendous volume that is dumped there. The result is that we have not been able to determine just what is happening, and what the effects are on the shoreline and waters, and the fish that are in that area.

We also spent a few dollars trying to find out.

Mr. SARBANES. What is the nature of the working relationship you have with EPA?

Dr. MARTINEAU. For our programs I can discuss various types. One is the interagency which we have worked out with EPA as to the fact that we will work jointly with them. They are primarily responsible for designating the sites that they feel are of priority sites should be characterized, and then be monitored.

We then design the studies, and undertake them within our resources, or they reimburse us. If we are not able to undertake the studies ourselves, we work with EPA or go to a third party to carry them out.

In the New York area, where we have the major activity under our MESA program, we have strong working relationships with region II of EPA.

In fact, the document I provided you, which was our report to them, was the assessment we made for the alternative dumpsites.

We work with them in the regional areas. We have also provided them some certain technical and logistic support.

Our vessel was involved with the incineration test, the burning in the Gulf of Mexico, aboard the *Vulcanus*.

We also have provided a buoy off the east coast for them for monitoring operations.

Mr. SARBANES. Is it fair to say from that response, that the framework within which you work is basically set by EPA, or do you set independently your own framework on the basis upon which you are going to operate?

Dr. MARTINEAU. I would say it is both.

In research we undertake our own research.

When we go to the characterization and monitoring we work with them, because they are the managers of the dump sites, and they have the waste management responsibility, and we are giving them support.

Mr. SARBANES. Thank you, Mr. Chairman.

Mr. EMERY. Thank you very much, Mr. Chairman.

A question was raised a few minutes ago as to whether or not ocean dumping was desirable or whether or not it should be phased out.

It does not really take a great deal of research to figure out that ocean dumping is bad for fish and for the ocean in general. It costs a lot of money, but there is a known solution.

I also sat on the Science and Technology Committee and we had at that time a similar series of hearings.

One of the ideas that some of us had been considering is a system that would process waste material, from New York or Philadelphia, and actually create something of value from the waste products, specifically energy.

Through certain projects that have been devised, as in Seattle, Wash., where there is a process of planning and a construction of a treatment facility. There is treatment of some of their municipal waste.

The idea is not by processing some of this material, perhaps on a trial basis, it will be possible to produce a certain amount of liquid fuel or gas fuel that will be used for the generation of electrically powered vehicles or for some other purpose. At the same time residue can be processed in such a way that the effluent can be safely put into the ocean and produce the sanitary, solid waste or solid land fill from the solid pack that is left over.

The point is, this is really a long way from being a practical solution to the problems that we are faced with, but I am rather dis-

turbed that very little research and development, very little experimental money, and very little attention has been paid generally to that type of a solution.

Now, what are you aware of? What is your agency aware of as far as alternatives: ones that will make practical use of the waste material and help defray the tremendous cost of disposal?

Dr. MARTINEAU. The only items we are aware of are the ones we submitted to the Congress on disposal and some have been innovative. The New York area is having a study conducted. We pointed that out in our annual report to the Congress. We are looking at these alternatives through the Interstate Sanitation Commission and the commission is preparing a report which I believe is to be ready this year.

As for research, we know the general categories and where people are doing related work but we are again deferring to EPA because this is not a particular area in which we have a competence.

Mr. EMERY. The point I am making, whether it is EPA, NOAA, or whatever agency, is that no one really seems to accept responsibility. No one really seems to be anxious to push forward in a direction such as that, but we talk a lot about it. It is frustrating.

Section 203 of Public Law 92-532 reads:

To promote the coordination of research, investigation, experimentation, training, demonstration, surveys and studies for the purpose of determining means of minimizing or ending all dumping of materials within five years from the effective date of this Act.

That seems to be specific. Obviously the 5 years is going to pass without minimizing or ending all dumping, because there will be no practical alternative.

Dr. MARTINEAU. Well, I think this was pointed out by the chairman. It may be more than just finding an alternative. There will be the social and economic aspects for these communities which will have to be taken into consideration, but you are right; there is not a single alternative now coming forward in this area.

I think our view has been that this is a broad waste management problem that has to be taken into the total context by these communities.

The EPA is looking for ways of providing waste management systems, not only for the coastal cities but throughout the country. That is why we have not pursued this area, but have looked to EPA because they have the expertise and the programs.

Mr. EMERY. What do you personally feel is going to happen?

Is the ocean dumping going to continue despite the fact it is undesirable, unacceptable, and possibly dangerous, or are we going to go off and attempt to develop a reasonable substitute?

Dr. MARTINEAU. I believe we will attempt to be deriving reasonable substitutes; but if memory serves me correctly from testimony before the Senate in this area with new sewage treatment means that are going to take place the volume is likely to increase, so you are facing greater volumes of sewage to be disposed of.

EPA is concerned with the standards of treatment and the amounts so I am sure they are concerned with this problem and are working toward alternative methods of relieving this situation.

Mr. EMERY. As I stated, I am concerned with the problem. I have been working and my staff has been working to try to develop some kind of a demonstration act that would allow a community to enter into a project that would process, at least a portion of, their waste and generate a certain amount of energy by whatever means practical.

I do not know how expensive this is going to be. I do not know whether it is feasible. It would seem to me that if, in fact, a reasonable investigation of this particular approach indicates it is worth a try, I would think that this would be an area that NOAA, the EPA and many other agencies would be very interested in developing.

They saw two problems at once—the tremendous energy problem we are facing and the disposal problem we are discussing here. I just throw that out on the table for discussion between you and the rest of the committee as someone interested in this; and I may be coming to you at some time in the future with a few ideas to exchange along these lines.

But it would be very helpful to discuss that aspect a little bit more than it has been.

Dr. MARTINEAU. We will be pleased to discuss it with you.

Mr. MURPHY. Dr. Martineau, in light of NOAA's section 202 responsibilities, do you regard the overall Federal research effort on the long-range effects of man's activities on ocean ecosystems as adequate?

Dr. MARTINEAU. Well, section 202 is written rather broadly, Mr. Chairman, and I am sure that it is not entirely adequate.

Mr. MURPHY. What needs to be done?

Dr. MARTINEAU. As we take on the number of problems that are resulting from man's impact, we are finding that we have to do more and more, in particular the Outer Continental Shelf oil and gas is one area we are finding greater needs for assessments.

We have to know more about our coastal waters, particularly closer to shore.

We have to understand basic processes to better understand the effects upon ecosystems.

I think as we go forward and look particularly at overfishing, we have had an ongoing program—our marine resources and evaluation program—but I find that in that area we have to know more about our stocks. We have to have more information so we can better manage them.

These are just some of the type of problems I think we do have additional need for, and that we do not have adequate effort at the present time; and I think globally, as we expand our cooperation with nations, through the Intergovernmental Oceanographic Commission, which is starting to work on these problems, we have more to do, Mr. Chairman, and I do not believe we have really at this time a full understanding or the complete information and knowledge required.

Mr. MURPHY. I have several pages of questions that I would ask you to respond to for the record, by Thursday morning due to our New York hearing.

[The questions and answers follow:]

**RESPONSES TO QUESTIONS ADDRESSED TO DR. DONALD P. MARTINEAU, MAJORITY**

**Question 1.** You state on page 3 of your testimony that NOAA has initiated monitoring studies at individual dumpsites located on the Atlantic, Pacific and Gulf coasts. Could you be specific? How many dumpsites are being monitored and where are they located?

**Answer.** To date NOAA has initiated research and monitoring studies in the sewage sludge site in the N.Y. Bight, at two alternate sites in the Bight, in the Deepwater Dumpsite located 90 miles east of Cape Henlopen, Delaware, and in a dredge spoil area in Long Island Sound. Physical and chemical data have also been gathered in the vicinity of the dredge spoil site in the Apex of the N.Y. Bight as part of the overall MESA effort in that region. The initiation of studies in other areas, mentioned on page 3 of the testimony, is a reference to NOAA's planned program beginning in FY 1977 for which funding is currently being requested in the President's Budget.

The N.Y. Bight studies are being funded through our MESA project. The Deepwater Dumpsite work has been funded to this point through internal reprogramming. The Department of the Navy supported the dredging study in Long Island Sound.

**Question 2.** How many of your monitoring programs are specifically in response to the passage of this Act in 1972? What I want to make clear is that the studies in the New York Bight are not in response to this Act, but are funded through a totally separate, though not unrelated, project, that is, the MESA project. Is that correct?

**Answer.** The single NOAA program planned and conducted in specific response to the Act is in the Deepwater Dumpsite initiated in 1974 with reprogrammed funds. This is an area in which wastes are disposed by 25-30 different dumpers and is of high priority to EPA.

The MESA New York Bight project, a NOAA initiative developed in the early 1970's, is a broad-scale research effort closely related to the intent of the Act. Primary goals of this project are to determine the fate and effects of pollutants in the New York Bight ecosystem, and to identify the important ecological sub-systems, processes, and driving forces operating in the Bight region as a whole.

The project, although implemented in mid-1973, was designed and planned prior to passage of the Act, and was neither conceived nor funded in direct response to the Act. However, because of the immediacy of the ocean dumping problems in the Bight, the MESA project placed initial emphasis on ocean sludge disposal research. For this reason, we consider the MESA New York Bight project to be responsive to Section 201 of the Act, notwithstanding the fact that it was neither originally developed in response to nor funded under that Act.

**Question 3.** Could you describe the studies NOAA is carrying out at dredged material dumpsites?

**Question 3(a).** Is the New York Bight the only area under examination?

**Answer.** With the exception of the MESA work described below, and investigations recently completed by the National Marine Fisheries Service on dredging in Long Island Sound, NOAA has not undertaken comprehensive studies on dredged material dumpsites. However, we have, through our Sea Grant program, supported studies related to dredge disposal problems, e.g., on Effects of Dredgespoil Disposal on Benthic Animals, Regeneration of Marshes on Dredgespoil, Predicting Erosion of Dredge Spoil Islands, etc.

**Question 3(b).** What have you found at that dredged material site? What recommendations would you make for that dumpsite?

**Answer.** MESA studies conducted to date in the New York Bight have dealt only secondarily with evaluation of the dredgespoil site as such. Our work has not at this time yielded information that would allow us to make definitive recommendations concerning the impact of the site on the local environment.

**Question 3(c).** Should NOAA be doing more studies of dredged material sites? Does it have any planned?

**Answer.** In view of the 5-year program of research being conducted on dredging by the Corps of Engineers, NOAA made a decision to focus its



initial research efforts on municipal and industrial wastes. Whether we conduct additional work on dredgespoll sites will depend on such factors as resource availability and specific environmental concerns related to regional impact of the disposed material.

**Question 3(d).** Has NOAA considered entering a "Memorandum of Understanding" with the Corps of Engineers, such as it has with EPA?

**Answer.** NOAA is considering entering into an agreement with the Corps of Engineers similar to the March 1975 agreement with EPA.

**Question 4.** You mention on page 3 that you do research for EPA to help in decisions regarding the locations of new dumpsites. Have any new dumpsites been chosen since passage of the Act in 1972?

If so, what studies did you do prior to the selection of those sites?

Are any new dumpsites scheduled to be selected by EPA in the future?

If so, what role is NOAA playing in that decision?

**Answer.** In June 1975 a permit was issued by EPA for a site off the Savannah River, where wastes from a planned US/Japanese food processing plant were to be dumped. The site has not been used and our information from EPA is that the permit will not be renewed.

Another new dumpsite was designated tentatively in September 1974 for a test of at-sea incineration of chemicals. This area is about 140 miles south of Galveston. It may be designated officially following issuance of an Environmental Impact Statement by EPA.

While no special studies as such were undertaken by NOAA in the selection of the aforementioned sites, our National Marine Fisheries Service provided information to EPA regional offices on the marine resources in the areas.

In the New York Bight, NOAA conducted extensive studies in 2 possible alternate dumping areas with respect to possible relocation of the existing sewage sludge site. As of this date, no decision has been made with regard to use of the alternate sites. Elsewhere, our National Marine Fisheries Service interacted with EPA regions in providing information on living resources in the Savannah and Galveston site areas.

We are unaware of any other dumpsites that might be designated by EPA in the future. However, we expect that EPA would request NOAA's assistance in the selection of any new dumpsites.

**Question 5.** Specifically with regard to the New York Bight, what has been NOAA's recommendation to EPA on moving the current sludge disposal site further out to sea?

Has EPA made a decision on whether to move, and if so, to where?

**Answer.** Based on our environmental investigations of the proposed alternative sites we reported that if the site must be relocated, disposal of sewage sludge in the southern area would result in fewer environmental problems than disposal in the northern area. However, it should be further noted that NOAA's policy and advice is that the sewage sludge dumpsite should not be relocated at this time. This position is contained in letters from NOAA's Associate Administrator for Marine Resources to the Administrator of EPA II dated September 17, 1974, and October 6, 1975. These letters stating NOAA's position are also included in the report as Appendix A.

The essence of NOAA's position regarding the relocation of the existing sewage dumpsite and elimination of ocean dumping are stated in our letter of October 6, 1975 to EPA Region II.

"The sewage sludge dumpsite should not be relocated. The responsible public health agencies still have not evidence that the existing dumpsite poses a threat to the health and well-being of people using the beaches. There is also no evidence of massive migration of dumped sewage sludge toward the beaches of Long Island or New Jersey. Additionally, moving the dumpsite would not result in any significant overall improvement of the water quality of the Bight apex because the effects of the dumped sewage sludge are masked by the larger mass-emission rates of pollutants from shoreline outfalls, rivers, and embayments.

We urge that the dumping of sewage sludge in the New York Bight be phased out as soon as suitable land-based alternatives can be implemented. We recognize, of course, the need to examine potential alternative dumpsites in the event there is a real and pressing need to cease operations at the existing dumpsite prior to phase-out. Our recent investigations of the alternative dumpsite areas were, in a sense, NOAA's contribution to preparing for such

a contingency. We are in complete agreement with your goal of eliminating ocean dumping by 1981."

As of the date of this submission EPA has not announced a decision on whether to move the sludge disposal site or not. A decision from EPA is expected imminently.

**Question 6.** What have been the findings of your study of the deepwater dumpsite 106? Where do the toxic substances go? With what impact?

**Answer.** At this time we do not know with certainty what happens to the toxic substances being dumped at Deepwater Dumpsite 106. Preliminary findings with respect to our investigations are detailed in a recent NOAA Report, "May 1974 Baseline Investigation of Deepwater Dumpsite 106." This report was provided to the committee. There are some preliminary indications that the substances are quickly diffused and dispersed by current action in the upper 100 meters of the water column. It appears that there is no accumulation of dumped materials on the seafloor at the site.

Our present plans for 1976 include the investigation of pathways and ultimate fate of the major toxic substances.

**Question 7.** What conclusions about ocean dumping can NOAA draw now, as a result of two years of research as part of the MESA project?

**Answer.** Ocean dumping is without doubt the most visible and probably the most aesthetically displeasing activity contributing to the overall contamination of the New York Bight. We must not lose sight of the fact, however, that ocean dumping is only one of the contaminant sources. Others include atmospheric fallout, shoreline discharges of wastewater (municipal and industrial), and runoff gauged stream flow, urban runoff, and groundwater). We know now that:

1. Dumped dredge spoil contributes the major portion of the heavy metal impact (24-80%) with the exception of mercury. Seventy percent of the mercury is attributed to wastewater. Sewage sludge dumping contributes less than 6% of the heavy metal load.

2. Organic carbon primarily comes from wastewater, dredge spoils, and runoff.

3. Municipal wastewater and gauge runoff contribute 65% of the nitrogen to the Bight while dredge spoil and atmospheric fallout contribute most of the rest.

4. Municipal wastewater and dredge spoil account for 80% of the phosphorous input to the Bight.

5. Unchlorinated municipal wastewater and urban runoff from combined sewage overflows contribute the bulk of the microbial load.

Most of the effects of these contaminant impacts we observe appear to be in the Apex, that part of the Bight where the New Jersey and Long Island shores meet. Some contaminant effects are localized, near the respective dumpsites. Others, however, are more diffuse in nature due to the physical oceanographic processes which tend to mix and disperse the contaminants from the variety of sources.

Contaminant impacts on marine resources which have been identified include: (1) high prevalence of diseases in several species of finfish and shellfish, (2) major alterations in the distribution and abundance of bottom living organisms, (3) widespread distribution in exceptionally high numbers of coliform and fecal coliform bacteria, indicative of pathogenic bacteria (which findings have led to closure of clam fishing operations in extensive areas around the landward of ocean dumping sites), (4) bacteria which are resistant to broad spectra of heavy metals and antibiotics, and (5) noxious concentrations of suspended particulate material, flotsam and surface slicks, particularly on beaches used very intensively for bathing and sportfishing.

**Question 8.** What would you consider "harmful" dumping? Is all dumping "harmful?"

**Answer.** Ocean dumping is harmful when it:

1. Results in the death of significant numbers of fish, shellfish, and other organisms;

2. Results in the significant impairment or destruction of habitat required for fish or shellfish life history stages;

3. Renders fish and shellfish food either inedible or hazardous to human health;

4. Renders water unusable for industrial, recreational, or municipal uses by (a) changes in pH; (b) lowering dissolved oxygen levels; (c) high con-

centrations of organics, suspended sediments, and heavy metals; (d) presence of synthetic organic substances; and (e) objectionable taste and odor problems;

5. Interferes with safe navigation;
6. Results in visible pollution of nearshore waters and beaches;
7. Renders beaches unsafe for water-contact activities;
8. Results in potential long-term destabilization of an ecosystem of economic value;
9. Results in biomagnification of mercury and other substances leading to animal toxicity and possible health hazards to human beings; or
10. Causes genetic mutations of marine organisms.

**Question 9.** How much is NOAA asking for, for the purposes of Title II in the 1977 budget? This is the first time NOAA has requested any funds for Title II, isn't it?

NOAA is requesting \$1,070K and 3 positions for purposes of Title II in the FY 1977 budget. This is the first time that the Administration has requested funding under Section 204 of the Act.

**Question 10.** We have not yet received the executive communication regarding NOAA's request for funds for Title II. When can we expect it?

Comments on H.R. 11505, a bill to extend the Marine Protection, Research, and Sanctuaries Act of 1972, are now being reviewed within the Department of Commerce.

**Question 11.** Has NOAA considered using alternative research methods at sea, such as those suggested to this Committee at earlier hearings? I am referring to the "Short Term—Immediate Effects" study where samples are taken immediately before and immediately after the dumping operation. Also does NOAA take samples from the surface of the ocean floor or does it take core samples?

Answer. NOAA's MESA New York Bight Project has been looking at many aspects of ocean dumping. These have included fate and effect studies, mapping of distributions of contaminants and their apparent effects in the marine environment, and dynamic studies of ocean dumping operations.

Included in the latter are "Short Term—Immediate Effects" studies. We have tracked the acid waste dumping photogrammetrically looking at dispersive and advective characteristics. We have tracked sewage sludge dumping in the wake of the sludge disposal operation using chemical and acoustic techniques to study effects and dispersion. We are planning an extensive sewage sludge tracking experiment for July 1976. This will be an integrated investigation examining advective/dispersive characteristics, fractionization in the water column and short-term effects on organisms.

NOAA's sampling program has involved sampling throughout the water and sediment columns. We have examined sediment cores on the order of 2 meters as well as the near surface sediments and their resuspension characteristics.

**Question 12.** One final question, Dr. Martineau, on page 8 you state, "Through an interagency agreement with the Department of Interior/Bureau of Land Management, our agency has assumed a major role in the management of environmental assessment studies in Alaska. These studies, initially focused in the Northeast Gulf of Alaska and the Beaufort Sea, are directed primarily toward the establishment of environmental baselines and the assessments of the potential environmental impacts of OCS oil and gas development on the regional ecosystems. As a result of our studies in 1974 and 1975, we have provided BLM specifically with environmental data for use in these deliberations with respect to leased tract selection in the Northeast Gulf of Alaska."

What were your findings in these studies?

Answer. Environmental data were provided to BLM on three different occasions during the process of lease tract selection for the Northeast Gulf of Alaska. In August 1975, NOAA provided all available environmental data for the NEGOA area to the Bureau of Land Management for inclusion in the Draft Environmental Impact Statement (DEIS). These data included summaries of existing data as well as analyzed data acquired during the initial cruises completed prior to August. Data included for example, distribution and abundance of marine resources, preliminary descriptions of the physical oceanographic conditions, and preliminary geologic and geophysical data.

Further data were provided to the BLM for consideration in developing the Final Environmental Impact Statement. The most significant data forwarded included the documentation of areas critical to the protection of the Pacific Halibut, including their spawning grounds. Also forwarded were additional geological data which required considerations in lease tract selection. These geological/geophysical data included definition of seafloor conditions that have implications with respect to the engineering suitability of various tracts within the proposed lease area. These seafloor conditions included surface and nearsurface faults, areas of submarine slumps and slides, areas where sediment thickness and seafloor slope indicate potential mass movement of the sediment and areas where thick, loosely consolidated Holocene sediment suggest possible problems in anchoring structures to the bottom.

To assist the Secretary of the Interior in his final decision on lease tract selection, NOAA again reviewed the environmental data obtained and forwarded to him an evaluation of the status of knowledge in the NEGOA in each element of the program, (physical oceanography, geology, etc.) and an estimate of the improvement in this information base expected to be available by December 1976.

Specific findings of the first year's study in the NEGOA region will be summarized in the next annual report to the Congress on Section 202 activities.

**Question.** Did they have any impact on the Department of the Interior's leasing decisions to your knowledge?

**Answer.** In making his selections for lease tract offerings the Secretary of the Interior did take into account the information provided by NOAA. Consideration was specifically given to the geologic and fisheries concerns.

As a result of the information provided by NOAA, the ten lease blocks east of 145°W Longitude that were identified as critical to the protection of Pacific Halibut stocks were deleted.

#### RESPONSES TO QUESTIONS ADDRESSED TO DR. DONALD P. MARTINEAU, MINORITY

**Question 1.** In the next-to-the-last paragraph on page 4 you mention the "detailed evaluation of two alternative dumpsite areas" in the New York Bight Area, carried out for ERA by NOAA.

**Dr. Martineau,** what was NOAA's recommendation to EPA with respect to movement of the existing sewage sludge dumpsite?

**Answer.** Under provisions of a May 7, 1975 Letter of Understanding with EPA II, NOAA undertook efforts to acquire and analyze data, and to evaluate these data relevant to two proposed alternative sewage sludge dumpsites on the New York Bight continental shelf. The sites lie approximately 65 nautical miles seaward of the Bight Apex, one site being north and the other being south of the Hudson Shelf Valley.

Based on our environmental investigations of the proposed alternative sites, we reported that if the site must be relocated, disposal of sewage sludge in the southern area would result in fewer environmental problems than disposal in the northern area. However it should be further noted that NOAA's policy and advice are that the sewage sludge dumpsite should not be relocated at this time. This position is contained in letters from NOAA's Associate Administrator for Marine Resources to the Administrator of EPA II dated September 17, 1974, and October 6, 1975. These letters stating NOAA's position are reproduced in Appendix A to the NOAA report "Evaluation of Proposed Sewage Sludge Dumpsite Areas in the New York Bight," February 1976.

The essence of NOAA's position regarding the relocation of the existing sewage dumpsite and elimination of ocean dumping are stated in the letter of October 6, 1975.

"The sewage sludge dumpsite should not be relocated. The responsible public health agencies still have no evidence that the existing dumpsite poses a threat to the health and well-being of people using the beaches. There is also no evidence of massive migration of dumped sewage sludge toward the beaches of Long Island or New Jersey. Additionally, moving the dumpsite would not result in any significant overall improvement of the water quality of the Bight apex because the effects of the dumped sewage

sludge are masked by the larger mass-emission rates of pollutants from shoreline outfalls, rivers, and embayments.

We urge that the dumping of sewage sludge in the New York Bight be phased out as soon as suitable land-based alternatives can be implemented. We recognize, of course, the need to examine potential alternative dumpsites in the event there is a real and pressing need to cease operations at the existing dumpsite prior to phaseout. Our recent investigations of the alternative dumpsite areas were, in a sense, NOAA's contribution to preparing for such a contingency. We are in complete agreement with your goal of eliminating ocean dumping by 1981."

**Question 2.** With reference to the bottom of page 4 and top of page 5 of your statement, is it known, as a result of NOAA's studies of "deepwater dumpsite 106," what happens to the toxic chemicals being dumped at that site by 25 dumpers? Where do they go? What is their impact?

**Answer.** At this time we do not know with certainty what happens to the toxic substances being dumped at Deepwater Dumpsite 106. Preliminary findings with respect to our investigations are detailed in a recent NOAA Report, "May 1974 Baseline Investigation of Deepwater Dumpsite 106." This report was provided to the committee. There are some preliminary indications that the substances are quickly diffused and dispersed by current action in the upper 100 meters of the water column. It appears that there is no accumulation of dumped materials on the seafloor at the site.

Our present plans for 1976 include the investigation of pathways and ultimate fate of the major toxic substances.

**Question 3.** As a result of more than 2 years of research, as part of the MESA project in the New York Bight, is it possible to draw any conclusions about the impacts of ocean dumping?

**Answer.** Ocean dumping is without doubt the most visible and probably the most aesthetically displeasing activity contributing to the overall contamination of the New York Bight. We must not lose sight of the fact, however, that ocean dumping is only one of the contaminant sources. Others include atmospheric fallout, shoreline discharges of wastewater (municipal and industrial), and runoff (gauged stream flow, urban runoff, and ground-water). We know now that:

1. Dumped dredge spoil contributes the major portion of the heavy metal impact (24-80%) with the exception of mercury. Seventy percent of the mercury is attributed to wastewater. Sewage sludge dumping contributes less than 6% of the heavy metal load.

2. Organic carbon primarily comes from wastewater, dredge spoils, and runoff.

3. Municipal wastewater and gauge runoff contribute 65% of the nitrogen to the Bight while dredge spoil and atmospheric fallout contribute most of the rest.

4. Municipal wastewater and dredge spoil account for 80% of the phosphorous input to the Bight.

5. Unchlorinated municipal wastewater and urban runoff from combined sewage overflows contribute the bulk of the microbial load.

Most of the effects of these contaminant impacts we observe appear to be in the Apex, that part of the Bight where the New Jersey and Long Island shores meet. Some contaminant effects are localized, near the respective dumpsites. Others, however, are more diffuse in nature due to the physical oceanographic processes which tend to mix and disperse the contaminants from the variety of sources.

Contaminant impacts on marine resources which have been identified include: (1) high prevalence of diseases in several species of finfish and shellfish, (2) major alterations in the distribution and abundance of bottom living organisms, (3) widespread distribution in exceptionally high numbers of coliform and fecal coliform bacteria, indicative of pathogenic bacteria (which findings have led to closure of clam fishing operations in extensive areas around the landward of ocean dumping sites), (4) bacteria which are resistant to broad spectra of heavy metals and antibiotics, and (5) noxious concentrations of suspended particulate material, flotsam and surface slicks, particularly on beaches used very intensively for bathing and sport-fishing.

**Question 4.** On page 13 you express the desire that all "harmful" dumping be terminated as soon as possible.

**Question 4(a).** Can you give an example of what you would consider harmful dumping?

**Answer.** Ocean dumping is harmful when it:

1. Results in the death of significant numbers of fish, shellfish, and other organisms;
2. Results in the significant impairment or destruction of habitat required for fish or shellfish life history stages;
3. Renders fish and shellfish food either inedible or hazardous to human health;
4. Renders water unusable for industrial, recreational, or municipal uses by (a) changes in pH; (b) lowering dissolved oxygen levels; (c) high concentrations of organics, suspended sediments, and heavy metals; (d) presence of synthetic organic substances; and (e) objectionable taste and odor problems;
5. Interferes with safe navigation;
6. Results in visible pollution of nearshore waters and beaches;
7. Renders beaches unsafe for water-contact activities;
8. Results in potential long-term destabilization of an ecosystem of economic value;
9. Results in biomagnification of mercury and other substances leading to animal toxicity and possible health hazards to human beings; and
10. Causes genetic mutations of marine organisms.

**Question 4(b).** How do you assess the risk of releasing drug-resistant strains of microorganisms in the New York Bight through the dumping of sewage sludge?

**Answer.** A brief discussion of drug-resistant coliform bacteria in the New York Bight was given in MESA's guidance to EPA, Region II regarding sewage sludge dumping. We did not give more guidance as to public health implications since EPA and the FDA have more expertise than we do in the public health area.

We emphasize, first, that there are several significant sources of drug-resistant bacterial strains apart from sewage sludge. The inputs to the Bight of drug-resistant bacteria are probably roughly proportional to the numbers of "indicator" coliform bacteria. It is significant that most of the coliform bacteria entering the Bight are from non-sewage-sludge-dumping sources, as indicated below:

ESTIMATED PERCENTAGE CONTRIBUTIONS, BY SOURCE, OF FECAL COLIFORM BACTERIA ENTERING THE NEW YORK BIGHT

Percent contribution	Source of fecal coliforms			Runoff
	Sewage sludge dumping	Dredge spoil dumping	Wastewater	
Winter.....	<0.001	<0.001	91	9
Summer.....	<0.001	<0.001	84	16

These estimates of coliform inputs are from a recent MESA-funded study. They make clear that wastewater discharges (largely municipal wastewater) contribute much more coliform bacteria than does sewage sludge (and dredge spoil) dumping. We do not know how many of the human enteric bacteria from wastewater discharges actually reach the Bight alive, nor have we good evidence that the numbers of fecal coliform bacteria are good indicators of the numbers of drug-resistant bacteria liberated. However, fecal coliforms are, now, the best indicator we have of how many drug-resistant bacteria are liberated from various sources. MESA is pursuing this problem by supporting research into the sources of drug-resistant bacteria, particularly *Staphylococcus aureus*.

Our assessment of public health risks from drug-resistant pathogens in the Bight is based upon the technical literature and personal correspondence with investigators more familiar than are NOAA personnel with public health considerations. The feeling of medical and epidemiological experts seems to be that drug-resistant bacteria, and even "transfer-resistant" strains in the

Bight do not constitute significant public health hazards. This tentative conclusion is based upon the fact that people are more likely to be infected by drug-resistant human pathogens from several terrestrial sources than from the Bight. Thus, the fact that drug-resistant pathogens are present in the Bight seems relatively unimportant, yet a matter that warrants further investigation.

**Question 4(c).** How do you assess the risk that Sunday fishermen may be poisoned through eating fish and shellfish contaminated by waste-dumping in the Bight?

**Answer.** We note, first, that the FDA closed a large area of the New York Bight, initially because of ocean dumping of sewage sludge. This closure area was later extended to the New York and New Jersey shorelines in 1974. This extended closure was due to presumptive evidence of contamination due to sources other than ocean dumping. MESA staff members have had several discussions with FDA personnel about this closure, and we are convinced the reasons for closure were, and remain, sound. The very high level of fecal and total coliform bacteria found in some Bight waters and sediments are presumptive indicators of human pathogenic bacteria. It is also probable that at least some human viruses accompany these coliforms.

Several investigators have also documented exceptionally high concentrations of toxic heavy metals and organic compounds in the Bight sediments near the dredge spoil and sewage sludge dumpsites. We now have no evidence that these metals and organics are taken up by fish or shellfish in concentrations which would pose a danger to Sunday fishermen. However, we do feel that this potential problem is significant enough to justify careful analysis of existing data, and perhaps additional data gathering.

The high concentrations in sewage sludge of coliform bacteria, accompanying human pathogens, heavy metals and organic compounds are major reasons for our not recommending relocation of the existing dumpsites to cleaner areas of the ocean.

**Question 5.** Dr. Martineau, you note at the top of page 7 that "NOAA does not have a major cooperative effort with the Corps of Engineers. . ."

**Question 5(a).** Would such an effort be desirable?

**Answer.** In view of the Corps of Engineers extensive 5-year study, the Dredge Materials Research Project, NOAA made a decision to focus its initial efforts on municipal and industrial wastes. Since the Corps study is not yet completed, we believe it is not necessary to consider a major cooperative effort with them at this time. This, however, does not preclude cooperation at specific sites.

**Question 5(b).** Is any attempt being made by NOAA and the Corps to enter into a Memorandum of Understanding similar to that between NOAA and EPA?

**Answer.** We are considering entering into an interagency agreement with the Corps of Engineers similar to the agreement between NOAA and EPA.

**Question 5(c).** Does NOAA have any plans to monitor any deepwater dredge spoil dumpsites?

**Answer.** To our knowledge there exist no dredge spoil sites that are considered deepwater sites (greater than 200 meters).

**Question 5(d).** Do you consider it desirable that such monitoring be conducted?

**Answer.** We consider it desirable that all major dredge spoil sites be monitored to some degree, depending on the nature of pollutants found in the dredge spoil, their concentrations, amount of dredgespoil dumped, proximity of the site to fishing or spawning grounds, etc.

**Question 6.** With reference to page 8, in light of NOAA's Section 202 responsibilities do you regard the overall federal research effort on the long-range effects of man's activities on ocean ecosystems as "adequate"? If not, what more needs to be done?

**Answer.** We believe that the Federal Government is making an honest effort to ensure that the required research is focused on those environmental problem areas of greatest concern. As to an evaluation of total program adequacy, we would say that in certain areas, such as environmental assessments preparatory to OCS leasing, the present effort is probably adequate. However, with respect to marine pollution, in general, there is a great deal more that needs to be done. We refer here to all three general categories of pollutants—petro-

leum hydrocarbons, heavy metals, and synthetic organics. These materials are spread throughout the world's oceans which makes them of global concern. A number of international efforts have been organized in recent years in order to deal with this problem. In the United States considerable research on the major pollutants is in progress by the public and private sectors.

The determination of what more needs to be done is the purpose of NOAA's planned program to implement Section 202. The identification of specific research needs beyond the needs being met by ongoing programs within Federal, State and private institutions is the end product of the program. While we could make some intelligent estimates right now concerning redundancy and lapse in research effort, we prefer not to prejudge the results of our review and analysis. It is planned to present some preliminary findings and recommendations in the report to the Congress on Section 202 activities for FY 1976.

**Question 7.** Would you please elaborate upon your remarks at the top of page 12 which states, "The development of the technologies involved in such alternative methods basically is outside of NOAA's background, mission and competence."

Why do you believe that NOAA does not possess the competence to accomplish those research efforts relative to alternative methods?

**Answer.** Today in the United States only 15% of the municipal sewage sludge produced is disposed of in the ocean and nearly all of that is in the New York-New Jersey metropolitan area. This means that 85% of the nation's sludge is disposed of by land-based "alternative methods." These include land application (60%) and incineration (25%). There are other techniques that are being researched and tested, including pyrolysis, wet-air oxidation, and at-sea incineration. EPA and its predecessor agencies have been conducting and funding research into waste treatment and waste disposal methods for many years. That agency has assembled the scientific and engineering talent and has acquired the laboratories and other facilities needed to develop, test, and promote the commercial availability of the latest concepts of waste treatment systems. Equally important, EPA has a statutory mandate under the Federal Water Pollution Control Act and the Clean Air Act to conduct this type of research and development. In addition to research and development funds available to EPA by statute, the agency administers a nationwide grant program for the construction of municipal waste treatment facilities.

NOAA has a very different mission than does EPA. We have had no occasion to build a research and development capacity for waste treatment and disposal systems. The sole statutory authority to enter this field is Title II of the Act, more specifically Section 203. We do not believe that is in the nation's best interest for NOAA to build a research capability in this area, primarily because of the near-certain duplication with EPA's R&D effort that would result.

**Question 8.** Please provide NOAA's interpretation of Sections 202 and 203 of Public Law 92-532. Include all duties you feel are imposed upon your agency by this statute.

**Answer.** Section 203 was addressed in the answer to the previous question. With regard to Section 202, this is an extremely broad mandate that Congress assigned to NOAA. According to the legislative history of this section, it was not intended by this provision that NOAA would mount an extensive in-house program of ocean pollution research. On the other hand, there was an intent to give NOAA a major role in coordinating the federal research effort on the long-range implications of various marine pollution, overfishing, and other human activities. This assignment is an extraordinary difficult and complex challenge. In addition to the wide scope of the provision, we are confronted with an institutional structure that is highly fragmented.

We believe that the implementation of Section 202 is clearly in the long-term national interest. As for the specific tasks imposed on NOAA by this provision, we would identify the following:

(a) Review and analysis of legislation defining NOAA's marine environmental research responsibilities.

(b) Review and analysis of current NOAA marine environmental research activities.

(c) Review and analysis of marine environmental research activities of other Federal and state agencies.



(d) Organization of meetings and conferences for the purpose of defining the problems and assessing existing research capabilities and thrusts.

(e) Identification of research gaps, overlaps, and opportunities.

(f) Selection of desired research objectives and coordination mechanism needed to achieve them.

(g) Recommendations on new or revised legislation, if needed.

(h) Negotiation of interagency agreements.

(i) Coordination of total Federal marine environmental research effort.

(j) Integration of national research efforts with international programs.

Mr. MURPHY. At this time, we will excuse the witnesses from NOAA and we do appreciate your participation this morning.

Our next witness is the Honorable Harry Kelley, mayor of Ocean City, Md.

It was a privilege to go to Ocean City, Mayor Kelley, where you were a great host to our OCS Committee. Of course, you could not prevent a hurricane, but in spite of the hurricane, the facilities and everything that took place there was very satisfactory.

Mayor Kelley.

# STATEMENT OF HON. HARRY W. KELLEY, MAYOR, OCEAN CITY, MD.

Mayor KELLEY. Thank you, Mr. Chairman. It is a real pleasure to get back here and see you and shake hands with you.

Respected members of the committee and, if I may indulge, the mayor is very proud of his official family; the majority of them are here today, and if you will permit me, I would like to introduce you to them.

Mr. MURPHY. You certainly may; and any you want to join you at the witness stand, invite them up.

Mayor KELLEY. We are going to try to make a setting for you and put down in Ocean City later on.

Mr. Chairman, I would like to introduce Councilman Trimper, Councilman Hardy, Councilman Frame, Councilman Father Bernard Dorsch, and I guess my right arm and half of my left and all of my brain, my solicitor, Mr. Dale Campbell.

Councilman Trimper and Councilman Dorsch, would you please come up here and get this picture? Because we are going to try to portray a proper setting for you, Mr. Chairman, of the roar of the ocean, the serenity of the beach and the sounds of the seagulls.

I would like for this committee to know that I guess one of the prettiest views, Mr. Chairman, I have ever seen in my entire life is here that shows you the beautiful beach and beautiful ocean; and we want to protect it.

We are strictly tourism, recreation, rest, fishing, both commercial and pleasure; and I do not think I have ever seen anything prettier than that.

That is what we are up here today to protect.

Mr. MURPHY. Not exactly Coney Island, is it?

Mayor KELLEY. No, sir. You have been there. This is the most beautiful beach in the world.

You will have to pardon me, Mr. Chairman. I am a country boy. But we are trying to get a job done; and I would like to have Mr. Castle come by and let you all see what our beach looks like.

I have a little case here, in addition, that I want to give you, which contains a key to the city of Ocean City so you can always come in.

Mr. MURPHY. I know the mayor feels those keys have a priceless value; but you know, there is a restriction on members as to just what you can give them these days.

Mayor KELLEY. Well, as I said before, it is a real pleasure and a privilege to be back; and I thank you for this opportunity on behalf of the mayor, the city council, and all peoples of Ocean City, Md.

I am Harry W. Kelley, mayor of Ocean City, Md.

Mr. Chairman, members of the committee, I appreciate this opportunity to appear, once again, in this honorable legislative forum.

Once again, today I find myself testifying in general opposition to ocean dumping of sludge and industrial and commercial poisons.

However, unlike my appearance at EPA hearings, I sincerely feel this committee is capable and will assimilate my testimony, and take whatever action is necessary to rectify a problem of a very serious nature.

This area of ocean dumping regulation is an area where Congress has met its responsibility. The ocean dumping problems have not been created by bad law. The problems have increased and continued by reason of abdication of responsibility by the Environmental Protection Agency.

Gentlemen, in October of 1972, Senator Caleb Boggs of the State of Delaware, speaking in support of the ocean dumping legislation then pending, said, and I quote:

Mr. President, within a few hours of this moment, a barge will leave a pier in Philadelphia to begin its journey down the Delaware River. The barge loaded with over a half million gallons of Philadelphia sludge, is destined for an ocean site about 12 miles off Rehobeth, Del.

In response to, or in concurrence with that speech, and many others like it, Congress passed strong legislation to severely limit and regulate ocean dumping.

Today, gentlemen, I appear before you as the elected representative of a governmental subdivision and as a part of my statement, say the following:

Mr. Chairman, within a few hours of this moment, a barge will leave a pier in Philadelphia to begin its journey down the Delaware River. The barge loaded with over 1 million gallons of Philadelphia sludge is destined for an ocean site about 35 miles off Ocean City, Md. And, Mr. Chairman, within a few hours or within days of this moment, another barge will leave a pier in Edge Moore, Del., to begin its journey down the Delaware River.

The barge, loaded with 1 millions gallons of E. I. Du Pont de Nemours & Co.'s arsenic, merchry, cyanide, oil, grease, and other poisons and waste materials. is destined for an ocean site approximately 40 miles off Ocean City Md.

And, Mr. Chairman, within a few hours or days of this moment, another barge will leave a pier far up the Delaware River to begin its journey down the waterway.

This barge, loaded with 1 million gallons of Camden, N.J., sludge, is destined for an ocean site about 35 miles off Ocean City, Md.

We could also, Mr. Chairman, make statements, similar to those just made, in respect to other parties, such as Sun Oil, New Jersey Zinc Co., and others but, hopefully, the point is made.

I have reviewed the Marine Protection, Research and Sanctuaries Act of 1972. I have had it reviewed by attorneys and by others. Nowhere in that act is it stated the ocean off Maryland is to become the cesspool of the Eastern United States. Yet, since the passage of this legislation in 1972-73, there has been a rush by Government agencies and private companies in New Jersey, Pennsylvania, and Delaware, to obtain EPA permits to dump filth and poisons in waters offshore of Maryland.

If you had never passed the law these States would have dumped off their own shores or within their own jurisdictions.

They would not have dared to have risked the confrontations that would have resulted.

Now, however, the EPA permits issued and granted as a matter of course have legalized what could not have been legally done prior to the passage of the Federal legislation.

In your invitation to me, you attached a list of seven suggested questions for the purpose of inviting comment.

In response to the adequacy of the Washington administration of the program, I must reply that when a bill designed to limit, restrict, and stop ocean dumping is used, in the case of Maryland's waters, to increase the amount from zero gallon, to over 280 million gallons per year, I have no choice but to say that the Washington bureaucrats administering this program have done a completely inadequate job.

In response to EPA's priorities, I am forced to say the problem is not with EPA's setting of priorities. The problem is the Agency deliberately and intentionally, with knowledge, is completely ignoring the dictates of Congress. They are going in the wrong direction.

They consider the Federal legislation—the Sanctuaries Act—as legislative authority for previously unauthorized ocean dumping. And so long as EPA is ignoring the intent of Congress, we beg you not to increase their funds.

The more funding you give them, the more personnel they will be able to hire to hold more hearings on more applications, and grant more permits to again increase ocean dumping.

We would suggest that you stop all ocean dumping funding of EPA. If you do that, you will accomplish the goals you set in 1972. Why?

Because the act, in essence, states, no one will dump without a permit from EPA. If you stop EPA from issuing permits, you stop ocean dumping.

Your fourth question asks how the program is administered at the regional level. The region administers its program efficiently. But their program is not the program Congress thinks it is.

Their program is a program of issuing permits to increase ocean dumping, and they do darned well at that in that they are efficient. However, in respect to the anticipated program conceived of by Congress in 1972, the answer is unquestionably "No."

I cannot comment on the fifth suggested question; but I will comment on question No. 6, which inquires as to what alternatives to ocean dumping are being looked into.

This is what you were talking about, Congressman Sarbanes.

I quote from a statement made at an EPA hearing in 1975 in this city, given by Carmen F. Guarino of the Philadelphia Water Department:

"Unless the city"—meaning Philadelphia—"is authorized to dispose of the 175 million gallons of sludge by ocean disposal, the unavoidable consequence will be that the removed solids contained in this sludge will be discharged directly or indirectly into the Delaware River."

And Michael Nelson of that city's water department stated, at the same hearing:

"Solids normally, and disposed 50 miles away from land in the ocean will find their way into the Delaware River."

Those statements were made 3 years after passage of the Federal legislation.

It is also interesting to note the State of Pennsylvania, in response to the Federal legislation, passed a State law which forbids the city of Philadelphia from transporting its sludge anywhere else in Pennsylvania without the permission of those in the outside areas; and yet, we are being dumped on against our vigorous opposition.

The last suggested question has to do with the enforcement activities of the Coast Guard, and others. In respect to the Coast Guard, I must state that, unlike their expert rescue work, they are, in this type of enforcement, almost totally ineffective.

When issues are politically sensitive, the Coast Guard has been known to act very strange. When Russian fishing vessels are observed, from land, fishing a shoal that has always been 5 miles offshore, and the Coast Guard reports the vessels at 12 miles, it is a little too much to expect for us to have confidence in the Coast Guard in this regulatory area.

I might add here, Mr. Chairman, I have great respect for the Coast Guard. My father was a Coast Guardsman and he retired with a good record.

In fact, we feel there is potential for international incidents from this type of ocean dumping. Suppose the barge captain decided to short dump a load at the same time the Russians sneak inside the 12-mile limit and put their nets down for fish and bring up something else?

I think we probably would have been further along if we called it something else. But they better have a pretty good boom on that ship to bring it up.

I have known fishermen that had to drop their nets and buoy when they ran into it.

Then the EPA would be guilty of permitting the contamination of the fish the Russians illegally catch. But perhaps if the Russians complained, the EPA would listen. They haven't listened to the American people.

More seriously, by the Coast Guard's own reports, in this region, only 6 percent of the ocean dumping voyages are monitored and almost 50 percent of the dumping is done during darkness hours.

In summation, gentlemen, I would just say if this hearing is in respect to legislation that would result in a continuation of what has been occurring, then we are violently opposed to it.

As we see it, there are only two alternatives that can result in a solution.

First, this Congress can clearly indicate to the EPA that it was not the intention of Congress for EPA to act as a traffic director, shifting stuff—from one area to another, from land to sea. The other alternative is to repeal the act.

If you will remove the legalized permit system, we will stop the ocean dumping offshore of Maryland out of respect for the United States. We cannot stop a barge operating under the auspices of a Federal permit. But if you remove the Federal permit, our seamen and our watermen—our commercial fisherman will turn the barges around. Thank you for the invitation to testify and your time listening to us.

I would like to add, Mr. Chairman, that these problems are elsewhere. We have found high levels of toxic substances in Florida. The EPA has made one study down there at a cost of \$5,000. They cannot even tell you whether to eat the fish or not. Du Pont in Louisiana was told to stop putting waste out in the water, go to land-fill.

Now, I am going to shut up pretty shortly, Mr. Chairman, but I think it is utterly ridiculous. We do not need any studies. We have had additional finds out there at our dump site. It gives everyone some concern. That sludge known by another name which I certainly would like to call it; but in respect to all, I will not call it by its proper name at this time—

Mr. MURPHY. I think this sophisticated group may understand what you mean.

Mayor KELLEY. Yes, sir; you all know what Harry Kelley is talking about. This stuff does move around and those toxins, those arsenics, those poisons are out there. We have films to show that a fish or any organism in that ocean will die within 2 hours. If he stays an hour and a half, he swims off and later develops sores around his mouth and on his back. We do not want to catch that fish. And one last point, Mr. Chairman:

We know that the Mediterranean is dead from polluting it; from dumping this very stuff into the waters.

The Sea of Japan does not have a sign of life in it. Why would we gamble here? I think it is utterly ridiculous. And my last point is going to be, gentlemen, is that that is our swimming pool down there; and if you had one in your nice backyard enjoying it and your neighbor came over today and dumped a bucket of that stuff in your pool, you are going to raise some kind of hell with him.

I thank you.

I do want to say one thing, Mr. Chairman. I never know when to quit, but I appreciated your prefacing the remarks that EPA had not done a good job, either out in the field or defending itself; and I really did like to hear that.

I believe you are on our side right now.

Mr. MURPHY. Mayor Kelley, does the municipality of Ocean City generate any sludge?

Mayor KELLEY. Sir, I knew I was going to get that one. That goes back some time ago, Mr. Chairman.

The city had that taken away from it. The city could not bond that new system that is there now; so the county took it over and

formed a sanitary commission. We are trying to get rid of them, too, Mr. Chairman.

We are trying to buy them out; but as a matter for the record, I opposed, very strenuously, about several years ago, the lagoon system.

I got all the information from Congress that I could at that time, but I could not buck the engineers in the health department of the State of Maryland.

However, it is not a city jurisdiction right now but to answer your question, the city is not involved in that even though it is Ocean City's outfall. It is run by the sanitary commission which, at this point, the city does not have anything to do with.

But the sludge is burned. All of the sludge is burned and it is 90 percent treated and it does go out into tiers of 100 feet, or possibly a distance of 82.

We do take constant tests of that area to see if any algae is forming, to see if it is harmful to any of the fish or any of the shellfish that is in the area.

That is constant, Mr. Chairman, and we do watch our beaches because that, like I say, is a beautiful picture and we want protection, Mr. Chairman. You know that, because you have been there; but we do burn all sludge. It can be done.

Mr. Chairman, these alternative methods could be implemented and we have the examples like I have given you of the seas that are completely dead. I think it is utterly ridiculous here that we would gamble with the beautiful Atlantic Ocean.

Mr. MURPHY. Mr. Sarbanes?

Mr. SARBANES. Thank you very much, Mr. Chairman.

First of all, I want to say that as someone who in his youth, and even now, spends a good deal of time on that beach, I really appreciate what the mayor is saying about what a lovely area it is and how important it is to preserve it.

I also want to thank the mayor for his very powerful and his very graphic statement about the problem.

What do the fishermen tell you who go out and approach the area of the dump site about what they see happening out there?

Mayor KELLEY. Well, two things, Mr. Congressman.

At times there are garbage slicks as long as 12 miles and 15 miles wide; and several of them impair the fishing where they have always fished. Some have fished the area for probably 40 years, and they have gotten their nets tangled up in this sludge and they will not come back up, Congressman. They have to drop buoys and they have to go back and do additional work.

This is definite proof that this sludge is moving on our bottoms. Some of these scientists and engineers say it will not move, but let me tell you, when a storm kicks up out there, anything on the bottom will move. I do not care what it is; it will move; and this sludge is moving.

Mr. SARBANES. Now, the Chairman observed earlier with respect to the New York dumping that they do not really get to the site. They start dumping well before they reach it because obviously turnaround time is important to them. That is the cheapest way to do it.

Is the same thing happening up at Ocean City?

Mayor KELLEY. We are pretty sure it is, Congressman; because in this testimony, I said 50 percent of those dumpings are made at night; so who is watching them? They are not going all the way out there. They are going to cut it short, certainly.

Mr. SARBANES. What percent of them that are being monitored, do you know?

Mayor KELLEY. Well, I think possibly anywhere from 6 through 10 percent. I think the Coast Guard would verify that. That might be a high figure, because we have never been able to find out from the EPA just how much is monitored. We have asked the question.

Mr. Chairman, this is about my 10th time down there but, you know, they are not beginning to wear me out.

Mr. SARBANES. I have no further questions.

I do want to thank the mayor for an excellent statement and his steadfast perseverance in seeking a resolution of this very, very serious problem, to which I think EPA has failed to address itself.

I particularly underscore the fact that alternative disposal methods are, in fact, available. It is not as though we are dealing with a situation in which there is no alternative. There are alternatives.

Mr. Chairman, other jurisdictions have been compelled to use them at some economic cost and at some cost with respect to the political impact of it; and I feel very strongly that EPA ought to require Philadelphia, Camden and these private dumpers to move in the same direction.

Mr. MURPHY. Thank you, Mayor, and city councilmen. And Mr. Mayor, since you have really been in close contact with my office, both by mail and communication; and I want to thank you and let you know we appreciate it.

Mr. Oberstar?

Mr. OBERSTAR. Thank you, Mr. Chairman.

You made a very fine and persuasive presentation, Mr. Mayor.

Has the city looked at other alternative sites for Philadelphia to dump its waste?

Mayor KELLEY. We have never had a choice, sir. They just did it. That is why I am here.

Mr. OBERSTAR. Have you looked at other sites to suggest where they might dump?

Mayor KELLEY. No, sir; I want them the hell out of there—

When they tell Maryland places that you have got to get out of the water and you have got to get another system, let me tell you that Paris years ago made fertilizer out of this stuff. Chicago and other areas have found these means.

Look, one paper says I am paranoid, and I probably am, paranoid with this situation. I think it is utterly ridiculous to take that great God-given natural resource there, that ocean, take any chance whatsoever on polluting it.

What obligations have we got to the city of Philadelphia to dump you know what?

Mr. OBERSTAR. Well, that is what I am getting at.

Obviously, from their standpoint, they feel the ocean is the most convenient or the most easily accessible place to do it.

Mayor KELLEY. I refute that. They have all those abandoned mines up there. They can fill them up.

Mr. OBERSTAR. And if they have not taken the initiative to find one for themselves, maybe other jurisdictions ought to do that.

Mayor KELLEY. You say we made a strong presentation. You all vote that way.

Mr. OBERSTAR. Milwaukee converts their sludge into a well-known fertilizer. In northern Michigan, at Muskegon, the Corps of Engineers conducted a very successful study using sludge, treated sludge from municipal plants, spraying it into the woods and the forest areas and it speeded up the growth of trees and proved to be a very effective soil amendment; and with the fertilizer and the sludge, in addition to the humus, it stimulated and speeded plant growth.

EPA has done studies as much as 4 or 5 years ago. In fact, the first study I know of was commissioned back in 1966, for the use of treated municipal sludge, which was sprayed into coal mines, abandoned coal mines, in strips, leaving empty spaces in between the strips where the sludge was sprayed and it proved that the sludge stimulated plant growth on abandoned acid mine coal areas. The effect of the experiment was that the plant growth thus generated contained the drainage of acid waste.

You do not have to respray the areas. That is one of the attractive features of this process: the plant growth regenerates itself. Now, do you mean to tell me there are not places where they can do that with the Philadelphia sludge?

Mayor KELLEY. We have been hollering for them to do something else with it other than bring it into our ocean. I am telling you these hearings have definitely helped and there is no question.

Just recently, of course, for the first time in history I think these hearings and everybody, if they had not started working on it, I think EPA would have kept on giving yearly interim permits.

This last one, the findings we have made off of Ocean City which the Baltimore office found and the Philadelphia office covered up, resulted in EPA only giving a 90-day permit.

We are well on the way of getting them out of there.

Mr. OBERSTAR. Does the ocean current move right past your city?

Mayor KELLEY. Yes, sir.

Mr. OBERSTAR. And is it a uniform current?

Mayor KELLEY. No, sir; it is not. With your winds and your tides, that can shift from southeast to northeast very quickly overnight.

Mr. OBERSTAR. The direction of the current can also, with wind, bring that sludge ashore?

Mayor KELLEY. Well, we have certain signs of algae. We have never been able to determine it. We have sent it away for analysis; never got any answers back, so we do not know whether it is from the sludge or whether it is from something else.

Mr. OBERSTAR. Have bottom soundings been taken to determine if the sludge settles on the bottom right off the shore?

Mayor KELLEY. Well, these sludges have moved. We do know that because fishermen are getting their nets caught in it.

However, there is nothing living around that sludge, no shellfish whatsoever; and it is time to get them out; and the time is now.



Mr. OBERSTAR. No further questions.

Mr. MURPHY. Any other questions?

[No response.]

Mr. MURPHY. Thank you, Mayor Kelley, for your usual outstanding statement and presentation.

Mayor KELLEY. Thank you very much, Mr. Chairman, and members of the committee. Come see us again.

Mr. MURPHY. Our next witness is Brig. Gen. Kenneth E. McIntyre, Deputy Director, Civil Works Directorate, Office of the Chief of Engineers, U.S. Army.

Identify the other people.

**STATEMENT OF BRIG. GEN. KENNETH E. MCINTYRE, DEPUTY DIRECTOR, CIVIL WORKS DIRECTORATE, OFFICE OF THE CHIEF OF ENGINEERS, U.S. ARMY; ACCOMPANIED BY DR. ROBERT ENGLER, PROJECT MANAGER, WATERWAYS EXPERIMENT STATION; WILLIAM HEDEMAN, OFFICE OF COUNSEL, OFFICE OF THE CHIEF OF ENGINEERS; AND JOHN ZAMMIT, CHIEF OF OPERATIONS, NEW YORK DISTRICT**

General MCINTYRE. I am Brig. Gen. Kenneth E. McIntyre, Deputy Director, Civil Works Directorate, Office of the Chief of Engineers.

I have three members of the corps sitting here at the table with me and others in the audience.

On my left is Dr. Robert Engler; he is one of our project managers at our Waterways Experiment Station, and has under his direct supervision one of the major aspects of our dredge material research program.

On my right is Mr. William Hedeman, from the Office of Counsel, Office of the Chief of Engineers; and his area of expertise is the many regulatory programs.

On my far right is Mr. John Zammit, Chief of Operations in our New York district. He is here to respond primarily to questions you might have on the New York Bight.

However, I would suggest that detailed questions on that matter might well be posed upon your convening hearings in New York. At that time, we will have Mr. Zammit present to respond to specific questions concerning the New York Bight.

Mr. MURPHY. I am sure we will have a raft of questions for you.

General MCINTYRE. Yes, sir.

I appreciate the opportunity to testify on behalf of the Chief of Engineers regarding our implementation of the Marine Protection, Research, and Sanctuaries Act of 1972, which I shall hereafter refer to as the act.

Approval of the act authorized necessary regulation over the transporting and dumping of material into ocean waters, and provided the primary statutory basis for the Federal effort to control such activities.

The act vests responsibility for regulating the discharge of material, other than dredged material, with the Environmental Protection Agency.

Section 103 vests responsibility in the Corps of Engineers, in co-operation with EPA, for authorizing the transportation of dredged material for the purpose of dumping it in ocean waters.

The act singles out dredged material, because, in most instances, it does not have the characteristic effects of what is commonly considered a pollutant in the form of domestic and industrial waste. In fact, dredged material bears no chemical or physical resemblance to domestic or industrial waste. I wish to emphasize this point again; dredged material bears no chemical or physical resemblance to domestic or industrial waste. That is an important fact that one often overlooks.

Following approval of the act, the corps published a proposed regulation in the Federal Register on May 10, 1973. This regulation prescribed the policies and procedures to be followed in processing permit applications for proposed activities in navigable or ocean waters.

This regulation also served as interim guidance for our field offices during the 11-month period required to receive and evaluate comments concerning the regulation.

The corps published its final regulation for this permit program on April 3, 1974, which was subsequently republished on July 25, 1975. Dredged material disposal by any Federal agency other than the corps is governed by this regulation to the same extent as a non-Federal activity. Thus, such Federal disposal activities receive the same scrutiny as any disposal activity by the private sector.

Section 108(e) of the act allows the Secretary of the Army to issue regulations for the ocean disposal of dredged material associated with Federal projects undertaken by the corps.

Accordingly, the corps published final regulations in the Federal Register on July 22, 1974, to cover corps projects involving ocean disposal. These regulations also require consideration of the same criteria applied in processing permit applications from the private sector.

Both regulations require that a determination be made that any proposed disposal of dredged material will not adversely affect human health, welfare, or amenities, or the marine environment, ecological system, or economic activities to an unreasonable degree.

Moreover, both regulations provide an opportunity for public hearings.

The regulations support the selection of ocean disposal sites in accordance with criteria promulgated by EPA on October 15, 1973, and published in title 40 of the Code of Federal Regulations, part 227.

To the extent feasible, they require the use of recommended sites and the avoidance of EPA-designated critical areas.

The regulations further provide, pursuant to the act, for an independent corps determination of the need for ocean disposal. This determination is to be based on an evaluation of the potential effect which a denial of a permit would have on navigation, economic and industrial development, foreign and domestic commerce, and on other possible methods and locations for disposal.

Title III of the act authorized the Secretary of Commerce to designate marine canstuaries. These are areas of the ocean coastal

waters which he determines necessary to preserve or restore for conservation, recreational, ecological, or aesthetic values. The Secretary of Commerce may designate such sanctuaries after consulting with other interested Federal agencies, and obtaining the approval of the President.

The corps regulations require any permit applicant, whose proposed activity will be located within a marine sanctuary, to provide a certification from the Secretary of Commerce. The certification will state that the applicant's proposed activity is consistent with title III and can be carried out within the regulations promulgated by the Secretary of Commerce for that sanctuary.

The corps will not issue a section 103 ocean dumping permit unless the applicant has secured the Department of Commerce certification.

Corps construction of new ship channels and periodic maintenance dredging of existing channels are often affected by the act.

As I previously mentioned, all Corps projects involving ocean disposal are processed in accordance with our July 22, 1974, regulations. These regulations require extensive coordination with other Federal and local agencies, as well as the general public, before the proposed disposal can proceed.

Effective January 1, 1976, we are operating under a further constraint regarding our scheduled maintenance dredging. Corps dredging will not commence until we have prepared either an environmental assessment or, if required, an environmental impact statement, unless emergency conditions dictate. These documents will, of necessity, assess the environmental impact on any ocean dumping site serving such projects.

In a few cases, however, a separate environmental impact statement will be prepared for ocean disposal sites which serve additional purposes. A good example is the New York Bight which serves as a disposal area for a variety of materials ranging from domestic waste to dredged material.

The Coast Guard is the Federal agency responsible for ocean dumping surveillance. Since much of our dredging is performed by private industry vessels, we assume a joint responsibility in this area. Thus, we are presently involved in discussions with the Coast Guard to determine the most efficient method of Federal surveillance over private dredging vessels working under Corps contracts.

Though we do not feel this is a serious problem area, we are investigating various solutions. For example, the Coast Guard is developing a relatively inexpensive electronic surveillance system which will provide a permanent record of a vessel's location. This system may prove valuable to the Corps in monitoring our contract dredging vessels.

A further solution may lie in added personnel being devoted by either the Corps or the Coast Guard. In either event, we are working closely together to insure the most cost-effective solution.

Most of the applications we receive for ocean dumping permits are from port users who need to dredge berthing areas adjacent to congressionally authorized channel and harbor projects. Historically, ports were created in estuaries and rivers which served as harbors of refuge. Many did not have naturally deep waters.

Today's larger deep draft vessels, however, have necessitated Corps dredging of many main harbor channels. Dredging between these main channels and the ship berthing areas is the responsibility of the users or local port authorities. For many, disposal of the dredged material is a problem. Often they find that adequate upland disposal areas are no longer available due to urban growth surrounding the port. Open water disposal in inland areas is resisted actively by environmental interests.

The creation of artificial islands, composed of dredged material, is an alternative; however, it requires exceptionally time-consuming intergovernmental coordination. Thus, ocean disposal often is the only feasible alternative.

The Corps is continuing to process ocean dumping permit applications in accordance with our July 25, 1975, regulation and EPA criteria.

During fiscal year 1975, 53 applications for section 103 permits were received by the Corps, 42 of which requested disposal of dredged material beyond the territorial seas. The remaining 11 sought disposal within the territorial seas. Also, in this same period, 90 permits were issued for disposal beyond the territorial seas, and four were issued for disposal within the territorial seas.

I have included for the record a chart of "Permit Applications Received" for the Corps total regulatory program during fiscal years 1969 through 1975. These permit activities are within our responsibilities under the River and Harbor Act of 1899 and under section 404 of the Federal Water Pollution Control Act, and section 103.

Included on this chart is a special breakout of section 103 applications submitted since the act was promulgated.

We have had an opportunity to review H.R. 11505, a bill to amend the Marine Protection, Research and Sanctuaries Act of 1972 to authorize appropriations to carry out the provisions of the act in fiscal year 1977.

The Army Corps of Engineers is not directly affected by this bill. H.R. 11505 provides authorizations for appropriations to EPA and Department of Commerce; hence, we defer to the views of these two agencies on the merits of the bill.

Collectively, the Army Corps of Engineers is seeking approximately \$4 million in fiscal year 1977 to carry out our responsibilities under the act. These funds are being budgeted for under the following three areas of our civil works operations and maintenance general appropriation:

First, we estimate that about 1.5 percent of our general regulatory funds in fiscal year 1977 will be used for ocean dumping related work. This will amount to over \$0.5 million.

Secondly, the Corps is conducting a 5-year congressionally authorized dredged material research program, which I will discuss in detail in a few minutes.

Regarding funding, however, we are seeking a total of \$6 million in fiscal year 1977, of which we estimate that approximately \$3 million will be of direct benefit to ocean dumping research.

Our third source of ocean dumping related funding is from our operations and maintenance appropriations for specific channel and

harbor projects. Some of the project funds will be used, as required, for sampling, laboratory testing, and monitoring dredged materials at individual locations. I cannot give you an exact figure. However, we estimate that not more than \$0.5 million will be spent on these activities.

It has been suggested, during previous sessions at this hearing, that the Corps prepare an annual ocean dumping report. We have no specific objection to this suggestion. However, we are already providing substantial ocean disposal information regarding Corps activities to both EPA and NOAA for inclusion in their annual reports. We would prefer to continue this procedure so as to limit the number of separate agencies submitting annual reports.

Mr. Kenneth Kamlet's—National Wildlife Federation—statement questioned our revocation of prohibitions on the use of certain ocean dumping grounds off the northeast coast of Kodiak Island. I wish to clarify this matter.

The area in question had been designated for many years as a prohibited dumping ground because it was used for certain Naval operations.

In March 1975, the Navy informed us that they no longer needed this area for special operations and suggested that we remove the prohibited dumping designation. This we did, but only after due public notice from which we received no responses, other than letters of no objection from EPA, NMFS, and the 17th Coast Guard District.

On September 19, 1975, the Secretary of the Army approved the revocation of the ocean dumping prohibition, citing section 4 of the River and Harbor Act of 1905. This authority was correct since the revocation merely removed an absolute prohibition, a restriction, so to speak, against ocean dumping in the area. It did not, in any way, designate the area as an approved ocean dumping site. Dumping of materials in this area requires full compliance with the permit provisions of the act.

Mr. Kamlet also noted, and I quote:

"Moreover, corps regulations still on the books (33 CFR 205) and captioned 'Dumping Grounds Regulations' appear to assert on behalf of the corps, powers and responsibilities foreclosed to it when the MPRSA became effective," unquote.

We agree with Mr. Kamlet's observation, and wish to assure this committee that steps will be taken in the near future to purge those dumping grounds regulations which are no longer consistent with the requirements of the MPRSA.

In the interim, the corps regulations—33 CFR 209.120 and 33 CFR 209.145—are being followed in deciding whether or not a particular area will be utilized for the disposal of dredged material.

The corps' primary thrust in ocean dumping research is contained in the dredged material research program, DMRP. This is a congressionally authorized 5-year \$30 million program being conducted by the Corps Waterways Experiment Station in Vicksburg, Miss.

The objective of this very large multifaceted research program is to provide definitive information on the environmental impact of dredging and disposal operations. We are also developing dredging and disposal alternatives which are both economically feasible and environmentally compatible.

Results to date are showing, as alternatives to ocean disposal, marshes may be created, useful lives of confined disposal areas can be extended and, in some cases, dredged materials may become a valuable resource for landfill, strip mine reclamation, or agricultural enhancement.

Specifically, the DMRP is comprised of four research projects. One of these projects, and the one that Dr. Engler is primarily associated with, is devoted entirely to studying the effects of dredged material disposal on water quality and aquatic organisms.

In general, this project is determining (1) the short and long-term fate of dredged material subsequent to disposal; (2) the effects of dredged material disposal on water quality; (3) the effects of dredged material disposal on aquatic organisms; and (4) what constitutes the pollution status of dredged material.

The DMRP is over 60 percent complete and on schedule from all standpoints—funding, scheduling, and accomplishment of results. We have made significant progress in determining the fate and effects of contaminants associated with dredged material. Information obtained is being continually disseminated to the field for immediate implementation where applicable.

Here, in Washington, the corps and EPA are working closely together to update EPA's October 15, 1973, ocean dumping criteria.

As Mr. Kamlet stated in his testimony, the National Wildlife Federation has challenged this criteria.

We feel, however, that our present regulatory scheme, used to evaluate ocean disposal of dredged material, substantially incorporates the requirements of both the Marine Protection, Research, and Sanctuaries Act and the recent Ocean Dumping Convention held in London.

The corps' evaluation of ocean dumping activities includes a public interest review, as required by such acts as the National Environmental Policy Act, the Endangered Species Act, and the Fish and Wildlife Coordination Act.

As we move to bring the ocean dumping criteria into full technical compliance with the act and the Convention, be assured that our present evaluation procedures fully reflect the various environmental concerns addressed in our present regulation.

To insure that DMRP results, and the applicable results of other investigations, are actually being used to the fullest extent possible, the corps and EPA established a technical committee on October 16, 1975. This committee meets at least three times a year at various EPA laboratories and at the corps Waterways Experiment Station in Vicksburg, Miss. Comprised of both corps and EPA senior level scientists and engineers, the committee is insuring that all relevant research results, including those from the DMRP, are focused toward producing technically sound and implementable ocean dumping criteria.

In summary, the corps is devoting considerable effort and funds to determine if, and under what circumstances, ocean disposal operations may produce adverse impacts. We are making detailed physical, chemical, and biological studies of disposal areas, and have developed major research programs for monitoring the environmental effects of these operations.

These DMRP field investigations have developed procedures and methodologies for both the implementation of field monitoring and the interpretation of cause and effect relationships associated with aquatic disposal of dredged material.

Completion of many of these studies will require many more years. However, results to date strongly support the following four broad conclusions: (1) Dredged material is a complex solid and liquid slurry predominantly of soil material, sometimes contaminated with various domestic, industrial, and agricultural wastes. However, unlike many of these wastes, the presence of a chemical contaminant in dredged material does not necessarily indicate this material is polluted, as this term is understood to imply with respect to industrial wastes by them selves. (2) The ocean disposal of dredged material often has no significant adverse effects on the marine environment. (3) Few contaminants are released in detrimental quantities from dredged material to the water column due to disposal activities. In general, results indicates that contaminants associated with bottom sediment are not in an available form and are, therefore, not readily available to marine organisms. (4) In some instances, ocean disposal is actually environmentally preferable to land disposal.

I wish to make one final point. The corps is truly concerned with protecting the marine environment. We acknowledge that conflicts may occur between our traditional responsibility of maintaining the Nation's waterways and our new responsibility under the act.

In such cases, however, we look to our ongoing research efforts to provide us up-to-date tools to reach decisions.

The DMRP has placed the corps in a position of world leadership regarding the environmental effects of dredged material. Research results to date have established that disposing of dredged material in the ocean often has minimal, if any, detectable impact. Thus, we continue to believe that it would not be in the national interest to indiscriminately limit ocean disposal of dredged material at this time.

Mr. Chairman, this completes my statement. I will be pleased to answer any questions that you and members of your committee may have.

Mr. OBERSTAR [presiding]. Thank you very much.

Gentlemen, that was a very fine statement.

At this point, the Chair would like to announce for the record that Congressman Bauman is filing for reelection this morning and could not be present for this hearing. He would have been but for that very important fact of political existence, filing for reelection. That is taking your annual Civil Service exam, gentlemen, reevaluation by your supervisors.

Mr. Sarbanes, do you have any questions?

Mr. SARBANES. General McIntyre, the study that is underway, the dredged material research program, that involves all aspects of how dredged material might be disposed of?

General MCINTYRE. Yes, sir, it does.

Ocean dumping, dumping in inland waters, alternative methods of disposing it, such as confinement in upland sites, confinement in

aquatic sites, use of dredged materials to create marshes and wild-life habitats, uses of it for agriculture enhancement, for strip mining reclamation, any reasonable alternatives is being explored.

Mr. SARBANES. Now, I notice you mentioned at the bottom of page 8 of your statement, some of the results that are showing as alternatives to ocean disposal, marshes may be created, useful lives of confined disposal areas can be extended, and in some cases dredged material may become a valuable resource for landfill, strip mine reclamation or agricultural enhancement.

Are those methods of disposal more costly than the ocean dumping as a general proposition?

General McINTYRE. Yes, sir.

Mr. SARBANES. By what sort of factor?

General McINTYRE. The primary additional cost, of course, is transportation. And I guess, to give a general statement, you would have to know how far you are going to transport it.

But, as a minimum, it is 10 percent greater, and it would probably be much larger in a typical case.

Mr. SARBANES. Well, the corps always does their analysis pretty much tied to the cost-benefits approach; is that correct?

General McINTYRE. Yes, I would say cost-effectiveness is applied to the specific case under consideration.

Mr. SARBANES. How do you factor in the environmental desirability of these methods as opposed to the ocean dumping when you strike a balance in making your judgment?

General McINTYRE. First, we would evaluate whether or not the ocean dumping of dredged material, and I am addressing only dredged material, of course, is harmful in this case through the application of a number of tests and evaluation factors of consideration.

If dumping in the ocean were not harmful per se, and I indicated in my statement, in most cases it is not, the disposal site thus properly selected, and reflecting the least cost solution would be recommended by the corps.

Mr. SARBANES. That is interesting.

Suppose you dump—you are going to dump in the ocean and let me assume for the moment that you get no environmental pluses from that.

Suppose you have another way of disposing of it?

Some of these things you talked about here, valuable resource for landfill, strip mine reclamation or agricultural enhancement, creating marshes which have a plus to them, now does that plus get put into the equation in order to balance off against the added cost; or does it not?

General McINTYRE. That is one of the very basic purposes of one part of the dredge material research program; that is, to establish criteria, including manuals, and guidance to our Philadelphia people on how to make those sort of evaluations.

Most of what we have done so far has been in the nature of research or demonstration projects. We recognize and have borne these initial costs for demonstration projects showing what is possible, rather than placing greater emphasis on cost-effectiveness analysis.

But out of this program will come specific criteria and guidance



that we can give to our Philadelphia people and other Corps district office program managers—guidance in effect to answer the very questions you raise.

Mr. SARBANES. You mean in terms of the benefits that are derived?

General McINTYRE. Yes, sir; that is right.

Mr. SARBANES. When do you expect this study to be completed?

It is a 5-year program. When will it be completed?

General McINTYRE. The total program will be completed in March of 1978.

However, we do publish results, specific facets of this study, as rapidly as research tasks are completed, so that much information will be available sometime prior to March of 1978.

Mr. SARBANES. Now, how harmful is the dredge material?

I take it that would vary greatly, depending on where you were dredging and what kind of pollutants were put into that particular area.

Would that be correct?

General McINTYRE. Yes, sir.

I would like to ask Dr. Engler to respond to that. This is his particular area of expertise.

Dr. ENGLER. The harm from dredged material is very obvious in the physical aspects when it is disposed of on the aquatic bottom. You get a mounding on the bottom.

If the material contains no releasable materials, it is recolonized by the flora rapidly and there are few visible impacts of short duration.

If, through testing procedures, you show there is at least man-made material in quantities, through biological assessment, that would be harmful then this harm would be mitigated by searching out another disposal alternative.

All of our open water disposal sites are historical sites. We see what the historical disposal has done at a site, compared to surrounding reference areas in the region. We have found to date only a physical impact which is that of changing bottom topography. We find today very active communities. These communities are usually different from the surrounding region.

If the dredged material is different—that is, if the surrounding region is sand and the dredged material is clay, the area is recolonized by organisms that prefer clay-type substrata. We have not yet detected any contaminants uptake by organisms living in these sites, nor, to my knowledge, has there been any contaminant uptake detected by organisms living on dredged material.

I have only seen one instance of iron, a micro nutrient, uptake by organisms living on the Narragansett disposal sites.

Mr. SARBANES. Thank you.

Mr. OBERSTAR. Well, I have a number of questions.

On page 3 of your statement, you refer to marine sanctuaries that must be approved by the Secretary of Commerce.

Are there any such on the east coast?

General McINTYRE. There has been no dumping of dredged material in any sanctuaries on the east coast, to the best of my knowledge.

Mr. OBERSTAR. Well, that was not my question.

The question is, are there any marine sanctuaries designated on the east coast, and where are they?

General McINTYRE. To my knowledge, I am not aware of any, sir.

Mr. OBERSTAR. Does that mean that the Secretary of Commerce has not determined any area of the east coast to be of any significant value?

I realize you cannot speak for the Secretary of Commerce, but that strikes me as being very unusual.

General McINTYRE. I am not sure if I am correct as to whether any have or have not been designated. But we do send a copy of our public notice involving the dumping of dredged materials to the representative of the Department of Commerce so that it could be compared against their records for presence of any marine sanctuaries. Please excuse the delay in my response. I have been advised by my staff that there are two designated sanctuary sites on the east coast; one off the Coast of North Carolina, the Monitor Sanctuary; and one off the coast of Florida, the Key Largo Sanctuary.

Mr. OBERSTAR. There are two sites.

But, in any event, before any dumping permit is issued by the corps, the location of that dumping would be checked with the Department of Commerce and they would have an opportunity to register their objection, presumably, if those were designated marine sanctuaries?

General McINTYRE. Yes, sir, that is correct.

Mr. OBERSTAR. Has the Secretary of Commerce provided certification for dumping of Philadelphia's waste?

General McINTYRE. I do not know the answer to that, sir. We are not involved in that.

The Philadelphia disposal operation is not a disposal of dredged material, but industrial waste, which is EPA's responsibility.

Mr. OBERSTAR. And in this matter where municipal waste dumping is occurring, the corps has no responsibility?

General McINTYRE. We do not have any permitting responsibilities for other than disposing of dredged material. With respect to dredged material disposal, this applies to the Atlantic Ocean in general and to the New York Bight site in specific.

Mr. OBERSTAR. You have no responsibility whatsoever for the Philadelphia waste dumping?

Who issues that permit?

General McINTYRE. EPA.

Mr. OBERSTAR. That is an EPA permit?

You raised a very interesting matter of alternatives to ocean dumping, where in your prepared statement you have discussed the use of dredged materials for creating—I assume that is creating—marshlands for extending the use of various dredge sites or dump sites, rather, for landfills, for stripmining reclamation and for agricultural use.

Are there any marsh areas that can be developed along the east coast that would presumably serve as waterfowl habitat and other wildlife habitat, and has the corps developed any of that?

General McINTYRE. Yes, sir.

We have developed a site in the James River as a part of our research program in order to determine such things as cost criteria and concept feasibility.

A number of our dredged material disposal sites have become wildlife habitats, particularly waterfowl refugees, simply because when vegetation takes over, these sites become very good areas for wildlife propagation.

One of our problems is they become so good that we cannot go back and reuse the sites as disposal sites in many cases.

Mr. OBERSTAR. I was not aware that dredged material had been used for stripmining reclamation.

I know this has been done, as I mentioned in an earlier hearing, with municipal wastes.

Could you give us an example of project area where dredge spoils has been used for stripmining reclamation?

Dr. ENGLER. It is not being done in practice. It is being researched as a possible alternative through a greenhouse study which is about midway complete. If the concept proves feasible, it will be tested in the field.

There is a joint effort by the Corps of Engineers and Bureau of Mines at an east coast stripmine site for a possible field study.

Mr. OBERSTAR. So that project is not completed yet?

Dr. ENGLER. Sir, I might add that dredged material in most cases is topsoil that had eroded into the water ways and found its way to bottom sediment of harbor areas. This topsoil does have a potential use in these cases.

Mr. OBERSTAR. On page 10, the second paragraph of your statement, you say, "We are making detailed physical, chemical, and biological studies of disposal areas."

What do those studies show, both in terms of positive benefits and adverse effects?

Dr. ENGLER. The open water sites constitute only a small part of our program. We are studying a site on the Great Lakes at Astubula, Ohio, an ocean disposal site off the mouth of the Columbia River, a Gulf of Mexico site, near Galveston, estuary sites near Baltimore, and an open water site in Florida.

As I mentioned earlier, the most dominant impacts are physical in nature where obvious bottom topography has changed. If a dissimilar substrait, such as mud, is placed on sand, you get a different flora on this, simply organisms that prefer to live on sand than on mud. They have different appendages.

When sand is placed on mud, you get changes in community structures on these organisms.

Upon disposal, you get a covering of organisms and a suffocating of some percent. We are evaluating this now in the laboratory and in the field. The impact is much smaller than we would have initially anticipated. The organisms tend to migrate vertically with ease.

However, the re-colonization rates of these areas are quite rapid in those cases where smothering does occur. We are searching very closely for any uptake effects that might have occurred, at least in historical sites, due to historical disposal and acute uptake of contaminants at these sites during controlled disposal operations which have just recently finished one disposal operation is going on right now.

We cannot show at this time any contaminant uptake by these organisms. One site is about a quarter of a mile from a spawning area. Lobsters spawn and then are attracted to this area. It has become quite an active fishery now, primarily due to the change in bottom topography.

In fact, it is such an active fishery that one can probably not dispose of dredged material. The sport fisherman tend to follow the harbor dredge out to the site.

The water column fisheries are attracted to the site.

We are looking at gut contents of these water column fish as well as tissue analysis, so on and so forth, to see what acute effects, if any, are occurring. Long-term effects on the fish are negligible.

The fish do not stay at any one site for any specific period of time. In these well mixed areas, it should not be a major problem at all with dredged material.

Mr. OBERSTAR. That is very good. That is very responsive to my question.

Has the corps continued, or is the corps continuing to dump dredged spoils in open lake disposal on the Great Lakes?

Dr. ENGLER. As a research effort only in Lake Erie, there is some small amount of open lake disposal of clean material and "contaminated" as determined by the bulk sediment analysis procedure.

I do not think any operational disposal is going on. I could stand corrected on this.

In the Lake Erie site, we are looking at three kinds of dredged material at our sites for research purposes only.

General McINTYRE. I would like to add, with regard to the Great Lakes, the cost of disposing material there is as much as 10 times over what it would have been to dump it in open waters.

Mr. OBERSTAR. That gets to my next question.

The cost of open dumping a few years ago, as I recall, was something like—the complete cost of dredging and barging out into open lakes and disposing of the waste was on the order of 60 cents to 90 cents a cubic yard. That has gone up to as much of \$6 a cubic yard with sand filtration barrier disposal areas.

General McINTYRE. That is correct.

Mr. OBERSTAR. Am I right on the figures?

General McINTYRE. Yes, sir.

Mr. OBERSTAR. I would like to make that comparison.

Now, what we are doing on the lakes, and I think the fact was pointed out, that is why I raised it here, is that the corps has done an outstanding job, going back to 1964, when the corps began its very comprehensive study of effects on the Great Lakes of open discharge of dredge spoils. It has largely eliminated dumping of dredge spoils and has moved to alternative programs. And one that I want to discuss in a minute is the Muskegon project.

I would like to have you transfer that technology and that cost-benefit analysis, which the corps has innovated and does so well, to the ocean dumping situation.

Now, could there be for this Philadelphia situation that we heard a moment ago, could there be diked contaminant areas?

Are there any feasible sites along the east coast?

What would be the comparable cost of barged open ocean disposal, as compared to diked containment areas?

General McINTYRE. I am sure that information can be developed since that is not within our agency's responsibility. We have not done that.

The cost would be substantially greater, and I would predict, based upon our experience, that finding the necessary quantity of land for upland disposal sites for that amount of material involved would be very difficult.

Our experience has been that land is very difficult to come by. The problem is that local people object to the use of the land for that purpose and, in some cases—and I simply cannot comment on the sludge disposal, I do not know—in some cases, upland disposal is more damaging to the environment.

Mr. OBERSTAR. Since that matter of municipal discharge is EPA's responsibility, I think we probably ought to direct that question to EPA, and we will do that. We'll extract that from the record—I would like to have a response from them. That is their bailiwick.

Does the corps do any ocean dumping of dredged materials along the east coast?

General McINTYRE. Yes, it does.

Mr. OBERSTAR. Where?

General McINTYRE. I would like to furnish that for the record, sir. We will identify the sites for the record.

[The information follows:]

#### OCEAN DISPOSAL OF DREDGE MATERIAL

Yes, the Corps does open ocean disposal of dredged material along the East Coast. For example, during a representative one-year time period (1 April 73 through 31 March 1974) the Corps used 17 ocean locations to dispose of 14,344,000 cubic yards of dredged material gathered from 32 congressionally authorized projects. Enclosed is detailed information regarding the specified project names, amounts (cubic yards and tons) of dredged material, and coordinates of the ocean disposal site.

**NEW WORK AND MAINTENANCE DREDGING ON CORPS PROJECTS DISPOSAL OF DREDGED MATERIAL IN OCEAN WATERS—APR. 1, 1973, TO MAR. 31, 1974**

Project	New work (N) Maintenance (M)	Cable yards	Approximate tonnage	Location of ocean disposal site
Charles River, Mass.....	N	65,000	98,000	42°25.5' N., 70°34.5' W.
Andrews River, Mass.....	M	25,000	40,000	41°28.7' N., 70°02.0' W.
Weymouth Fore and Town Rivers.....	N	1,087,000	1,630,000	42°21.0' N., 70°40.5' W.
New York Harbor—Gravesend Bay.....	N	876,000	1,428,000	40°23.8' N., 73°51.4' W.
Hudson River Channel—Weehawken Edge-water.....	M	402,000	489,000	40°23.8' N., 73°51.4' W.
New York Harbor—Red Hook Anchorage....	N	2,248,000	3,028,000	40°23.8' N., 73°51.4' W.
Bay Ridge Channel.....	M	398,000	449,000	40°23.8' N., 73°51.4' W.
New York Harbor—Ambrose Channel.....	M	513,000	788,000	40°23.8' N., 73°51.4' W.
Newark Bay—CONT. 7.....	N	980,000	1,715,000	40°23.8' N., 73°51.4' W.
New York Harbor—02.....	N	107,000	167,000	40°23.8' N., 73°51.4' W.
New York Harbor—03.....	N	83,000	128,000	40°23.8' N., 73°51.4' W.
Flushing Bay, N.Y.....	M	279,000	419,000	40°23.8' N., 73°51.4' W.
Westchester Creek, N.Y.....	M	135,000	203,000	40°23.8' N., 73°51.4' W.
Harlem River, N.Y.....	M	179,000	277,000	40°23.8' N., 73°51.4' W.
Newark Bay—Port Eliz.....	M	290,000	435,000	40°23.8' N., 73°51.4' W.
New York Harbor 0-4.....	N	799,000	1,239,000	40°23.8' N., 73°51.4' W.
Passaic River, N.J.....	M	75,000	166,000	40°23.8' N., 73°51.4' W.
Newark Bay—Port Newark.....	M	266,000	399,000	40°23.8' N., 73°51.4' W.
Tarrytown Harbor, N.Y.....	M	78,000	117,000	40°23.8' N., 73°51.4' W.
Cape Henry Channel.....	M	55,000	88,000	36°48' N., 75°54' W.
Cold Spring Inlet, N.J.....	M	70,000	89,000	242° TRUE, 1.2 to 1.5 mi from W. Jetty Light
Asbecon Inlet, N.J.....	M	199,000	296,000	147° TRUE, 0.8 to 1.1 mi from S. Jetty Light
Manasquan Inlet, N.J.....	M	45,000	68,000	20° TRUE, 600 yards from S. Jetty Light
Charleston Harbor, S.C.....	M	420,000	601,000	32°38.5' N., 79°44.5' W.
Port Royal Harbor, S.C.....	M	101,000	145,000	32°09.5' N., 80°36.1' W.
Savannah Harbor Bar Channel, Ga.....	M	1,883,000	3,051,000	31°57' N., 80°46' W.
Morehead City, N.C.....	M	402,000	678,000	34°41' N., 76°42' W.
Wilmington, N.C.....	M	1,089,000	1,838,000	33°50' N., 78°05' W.
St. Lucie Inlet, Fla.....	M	55,000	76,000	27°10' N., 80°09' W.
Fernandina Harbor, Fla.....	M	610,000	822,000	30°41' N., 81°22' W.
Canaveral Harbor, Fla.....	M	500,000	678,000	28°23' N., 80°34' W.
Fort Pierce Harbor, Fla.....	M	30,000	49,000	27°27' N., 80°13' W.
<b>Total.....</b>		<b>14,344,000</b>	<b>21,682,000</b>	

Mr. OBERSTAR. The locations where the dredgings came from, are these O. & M?

General McINTYRE. Yes; they would be predominantly O. & M., and possibly some new work also.

Mr. OBERSTAR. Who gives the Corps the permit to dump into the ocean?

General McINTYRE. In effect, we do this through the same evaluation process and criteria utilization. The end result is if the activity is to proceed, a statement of findings is prepared. We expose our activities through the public hearing process, and, if appropriate, environmental impact statements are prepared. Thus, each project receives the same scrutiny as the others.

Corps projects are subject to the same environmental controls and comment scrutiny of other Federal agencies as the private individual receives in seeking a permit.

Mr. OBERSTAR. I have mentioned the Muskegon project, Muskegon, Mich., and the Corps demonstrated that waste material can be disposed of on land, in an environmentally safe manner as as a soil amendment that stimulates plant growth.

Are there any locations on the east coast where either dredge spoil or municipal sludge is being disposed of in the manner suggested by the Muskegon project?

General McINTYRE. The Muskegon project is, of course, as you well know, a treatment of waste water.

It eliminates the production of sludge per se in that the treatment substantially eliminates a sludge handling problem.

Mr. OBERSTAR. Sludge—

General McINTYRE. Yes, sir, there are a number of demonstration sites other than this project. I am not aware of any on the east coast though.

Sludge produced in this land treatment process represents, perhaps, .5 percent of the total volume as compared to conventional treatment methods. Thus, it may be better for a city to treat its wastes through the land treatment method and avoid the production of sludge at all.

Mr. OBERSTAR. Now, on page 11 of your statement, you made two statements that intrigue me.

One, point two in your statement, the ocean—I am quoting:

"The ocean disposal of dredged material often has no significant adverse effects on the marine environment."

And the second, point four:

"In some instances, ocean disposal is actually environmentally preferable to land disposal."

How, why, and where?

General McINTYRE. Dr. Engler will respond to that.

Dr. ENGLER. We have already responded to the second one.

In the impacts we have seen in our open water disposal sites the physical impacts were the only major impacts seen. The bottom topography is changed.

I will quote again:

"In some instances, ocean disposal is actually environmentally preferable to land disposal."

Dredged material is a soil found in nature and created by nature. It is about 98 percent mineral, 2 percent organic carbon. So the mineral nature does not change, the pH may slightly change, where you are dredging it, to the point where you are disposing of it in the ocean. The change is basically negligible.

We cannot note any change within several tenths of a pH unit.

However, disposal, in some cases, in an upland confined disposal area that sits for a couple of years and dries out becomes an aerable soil, so to speak, and has high levels of sulfite materials. These sulfite materials are found in natural estuarine sediments, as well as harbor sediments. The sulfite is oxidized over a year and a half to sulfate in small quantities of sulfuric acid.

Where the pH can drop to an acidity pH of one, toxicity can occur and has been shown in cases where lands were converted to agricultural land and became very acidic in time.

Elements, such as cadmium, mercury, and lead, could be mobilized in some cases.

Mr. OBERSTAR. In the marine environment, you said a moment ago, there is little or no change in pH?

Dr. ENGLER. No, sir.

The pH of a sediment is normally neutral, about 7.5 or 7.6, and remains that when it settles out and deposits on the bottom.

Mr. OBERSTAR. What about plant growth due to nutrients that are in the disposed material?

Dr. ENGLER. The plants themselves elicit no particular pH change.

The plants, as compared to fauna, or animals, have a chance to uptake the same available constituent that the animals have. In other words, if contaminants in a sediment are biologically available, certainly they could be taken up by the animals living at these subterranean sites as well as plants that may be living there.

However, we are finding that most of these constituents apparently are not available under these conditions, and to be available, they must be in a soluble form and can cross a membrane into the living organism.

Mr. OBERSTAR. With dumping of the volume that we have reported here, say from Philadelphia, and I assume from New York, then you would have problems of increased turbidity, and I assume the aesthetic factor of change in water appearance, and also the problem of bacteriological effect on animals, organisms in the water.

And Mayor Kelley referred to fish that have developed sores and other adverse effects.

Dr. ENGLER. Sir, for the record, we are confusing dredged material disposal with sewage sludge disposal.

I am very adamant in stating the differences between these two terms.

Sewage is organic in nature. Fifty to 60 percent organic carbon. Five to 6 percent solids.

Dredged material is 98 percent mineral. The average organic carbon content of New York sediments, I believe, is about 2 to 4 percent.

Sewage sludge and dredged material are in no way similar.

Now, you mentioned the esthetic effects of turbidity. This is a real problem. We have detailed studies on the effects of suspended dredged material, suspended on a wide range of aquatic organisms, and found that these effects are biologically negligible or nonexistent at levels connected with dredge operations.

Mr. OBERSTAR. I am glad you clarified for the record the distinction I was trying to develop, because I think there has been confusion of municipal wastes that are barged up and being ocean-dumped, and the bottom material that is dredged by the Corps and is disposed of on land, in disposal containment areas, or in open dumping. And there is a significant difference in the contents and effects of these two kinds of wastes.

Dr. ENGLER. Sir, one more point.

This difference is recognized in the act and in the Ocean Dumping Convention since they set dredged material aside from the other regulatory functions.

Mr. OBERSTAR. On page 5, General, of your statement, I would like to clarify and have you clarify an ambiguity here.

You state, "53 applications for section 103 permits were received by the Corps, 42 of which requested disposal of dredged material beyond the territorial seas."

It says, "The remaining 11 sought disposal within the territorial seas. Also in this same period, 90 permits were issued for disposal beyond the territorial seas, and 4 were issued for disposal within the territorial seas."



Where does the 90 come from and what happened to the other 7 of the 11?

General McINTYRE. The first set of numbers refers to applications and I agree that there is too long a time for processing applications for dredged material disposal operations. The 90 and the 4 refer to applications that have preceded the 42 and 11. The difference is in the carry over of applications under review from one fiscal year to the next.

Mr. OBERSTAR. Okay.

Well, the last part of my question, then.

There are 11 requests for disposal within the territorial seas, 4 permits were issued.

Does that mean the other seven were denied?

General McINTYRE. No, sir.

The 4 may have been part of the 11 received in fiscal year 1975, or they may have been carried over from fiscal year 1974. I do not know for sure. But the rest of those were carried over into fiscal year 1976 processing times.

Mr. OBERSTAR. How many permit requests have been denied by the Corps for dumping either beyond the territorial seas or within the territorial seas?

General McINTYRE. I would like to supply that for the record, sir.

There are a number of them that are withdrawn in the face of controversy, and we never complete the processing.

To make sure that we use a full picture, I would like to address that and provide it for the record.

[The information follows:]

#### NUMBER OF OCEAN DUMPING PERMITS

No Section 103 permit applications have been denied by the Corps to date. Each application is subjected to a comprehensive review process, including public notices, environmental assessments, and review by other Federal agencies, to include Fish and Wildlife Service and National Marine Fishery Service. Based on the results of these coordination reviews, permit applications to date have been approved and permits issued. Often, during preliminary meetings with the applicant, he elects not to pursue the activity, thereby not submitting the application.

Mr. OBERSTAR. Counsel, do you have any questions?

Mr. PERIAN. We have some questions from Mr. Murphy, and I would like to submit them for the record and have a response from the general.

Mr. OBERSTAR. Those questions will be submitted, and if the corps would respond for the record, by the close of business Wednesday.

[The following was received for the record.]

#### QUESTIONS OF MR. MURPHY AND RESPONSES

Mr. Murphy. On page 1 of your statement, you assert that "the Act singles out dredged material, because, in most instances, it does not have the characteristic effects of what is commonly considered a pollutant." Is this indeed the reason dredged materials were singled out, or was it simply because the Corps had always had the responsibility of carrying out the dredging and Congress thought it would be easiest to let the Corps also dispose of the dredge spoils? Can you back up your assertion with documentation?

General McIntyre. The Corps can strongly document the assertion that, "... in most instances, dredged material does not have the characteristic

effects of what is commonly called a pollutant." However, my assertion that this was the reason dredged material was singled out in the Act cannot be documented and is probably inaccurate. I stand corrected on this point.

Mr. Murphy. On page 4 of your statement, you say that as of January 1, 1976 you are operating under a "further constraint." You then go on to describe how you will now have to comply with the procedures of the National Environmental Policy Act. Does this statement mean that you have *not* had to comply with NEPA *before* January 1 of this year? (If so, why not?)

Can you justify *not* having to comply with NEPA? Are there any court decisions that you know of to support your case?

General McIntyre. The enactment of NEPA directly impacted thousands of Corps projects that were in some stage of construction. A phased process was pursued to implement the requirements of NEPA in conjunction with available manpower and resources. The largest Corps projects—principally new construction—were addressed first. Smaller projects, some involving dredging, were subsequently addressed. Operation and maintenance projects (totaling almost 1000 per year) were given the least priority, primarily because the most significant environmental impact associated with these projects often had already occurred during the original construction stage. In addition, to have postponed needed maintenance dredging for these projects until full compliance with NEPA would have caused serious adverse impacts on the Corps other statutory responsibilities to maintain vital navigation for interstate and foreign commerce. In effect, it would have been the equivalent of building an extensive highway system and then allowing it to fall into disrepair for a protracted period of time.

In July 1974, the Office of the Chief of Engineers issued instructions to its field offices to reduce the backlog of environmental studies required under NEPA. First priority was given to maintenance dredging projects included in our FY 75 Budget. In addition, no dredging was performed after October 1974 without first conducting an environmental assessment under NEPA. Since 1 January 1976, no dredging has been initiated without an EIS, if the environmental assessment indicated the need for an EIS. During the interim period between 1 October 1974 and 1 January 1976, EIS's, when required, were prepared concurrently with ongoing maintenance dredging projects unless it was determined that the environmental considerations revealed during the environmental assessment outweighed the need to maintain essential navigation. In the latter case, the project was held in abeyance until the EIS was prepared.

In retrospect, we still feel that this process to come into full compliance with NEPA represented a balanced approach toward our responsibilities to protect environmental concerns and vital waterborne commerce.

Mr. Murphy. Has the Corps ever denied a permit to dispose of dredged materials in the last 4 years?

General McIntyre. Figures are not available for the last four (4) years, since the Marine Protection, Research and Sanctuaries Act was enacted in October, 1972 with implementation to begin six months later, in April, 1973. In FY 1974 and FY 1975, no permits for ocean disposal of dredged material were denied. Extensive coordination with other Federal agencies and a comprehensive review process for each permit application resulted in the issuance of the permit.

Mr. Murphy. Why, if the spirit of the law is being fully carried out, does one never hear of permission to ocean-dump dredged material *ever* being denied?

General McIntyre. Regarding your reference to "the spirit of the law," one must remember that before a proposed ocean disposal of dredged material can proceed, the disposal operation is subjected to the severe scrutiny of the criteria which were developed as a result of the law together with related legislation such as NEPA, the Fish and Wildlife Coordinated Act, the Endangered Species Act, and the Corps policy of issuing permits that are in the public interest. Contemplated operations which obviously could not meet this criteria and public interest review would not be applied for. In addition, a proposed ocean disposal operation experiencing difficulty passing the criteria would, in all probability, be withdrawn, rather than processed to denial.

Mr. Murphy. I am not sure I understand the statistics you give regarding the number of permits requested and the number granted. On page 5 of your statement, you say you received 53 applications for Section 103 permits. How many of these were granted?

Also on page 5, you say you granted 90 permits for disposal beyond the territorial seas and 4 within the territorial seas. Is this in addition to the 53 you just mentioned? How do these permits differ?

General McIntyre. Included within the 94 Section 103 permits issued in FY 1975 are, of course, some applications received during FY 74 but not finally acted upon until FY 75. The figure of 53 applications reflects actual permit applications received during FY 1975. Some of those received later in the year will not be completely processed until the following fiscal year. Carry-over results from the fact that processing time for permit applications is often lengthy due to required inspections, issuance of public notices and receipt of comments, coordination requirements and preparation of environmental impact statements when appropriate.

Of the 53 applications received for Section 103 permits in FY 1975, the number granted in FY 1975 is not available at this time. As previously mentioned, some of the permit applications will be carried over into the next fiscal year. Information can be obtained as to how many, if any, of these 53 were granted in FY 1975, but not in the time limitation set for answering these questions. For example, the Corps New York District, which received 30 of the 53 applications, reports that it would have to examine each of these 30 applications individually. The Corps will, of course, research this information should the Subcommittee still desire it.

Mr. Murphy. Relative to the 90 permits issued for disposal beyond the territorial seas, how much "beyond" the territorial seas (3-mile limit) was most of this dumping carried out? Was it just on the other side of the 3-mile limit?

General McIntyre. Sir, I will provide the information for the record.

#### SECTION 103 PERMITS BEYOND TERRITORIAL SEAS

Corps division or district	Number of permits	Mileage
1. New York District.....	76	12 mi offshore, n Atlantic Ocean.
2. New England Division.....	4	3.5 mi beyond the 3 mi limit.
3. Los Angeles District.....	4	3 dump sites: (1) 5.4 mi from Point Loma (2) 5-8 mi from mouth of Los Angeles Harbor (3) 7.7 mi from San Diego Shore.
4. San Francisco District.....	2	(1) 10 nautical mi south of Farallon Islands. (2) 22 nautical mi west of Pilar Point, Calif.
5. Jacksonville District.....	4	(1) 5 1/4 mi offshore from Jacksonville. (2) 3 1/4 mi offshore from Puerto Rico.
Total.....	90	

Mr. MURPHY. On page 9 of your testimony, you state that the Corps and EPA are "working closely together to update EPA's October 15, 1973 ocean dumping criteria." You then state that the National Wildlife Federation has challenged these criteria. May I ask which came first, the move to update the criteria, or the challenge from the National Wildlife Federation?

General MCINTYRE. The DMRP, since its inception, has conducted criteria development research and has coordinated results of this work with appropriate EPA officials. The promulgation of criteria and guidance for Section 404(b) of PL 92-500 in the 5 September 1975 *Federal Register* (which reflect advances in the state-of-the-art) is evidence of the continuing research and interagency coordination. Emphasis was then shifted to updating and incorporating the latest research findings into the Section 103 (PL 92-532) guidelines and criteria to bring these criteria into conformance with the recently published Section 404(b) guidelines and technical compliance with the requirements of the Ocean Dumping Convention.

Representatives of the Corps and EPA were involved in discussions over the need to revise the ocean dumping criteria at least one year before the NWF suit. However, the progress of these discussions from the standpoint of available manpower within the Corps was temporarily overtaken by the decision in *NRDC v. Callaway* to extend Section 404 of the Federal Water Pollution Control Act Amendments of 1972 to all waters of the United States. Final regulations on this program were promulgated on 25 July 1975, and nationwide public hearings were held thereafter. Since the same administrative, technical and legal Corps personnel involved in this program are also involved in the ocean dumping program, it is felt that the revised ocean dumping criteria could have

been published shortly after enactment of the requirements of the Ocean Dumping Convention but for the workload generated by the *NRDO v. Callaway* lawsuit.

Mr. MURPHY. In numbered paragraph 2 at the top of page 11, you note that dredged material "often has no significant adverse effects on the marine environment." Do you acknowledge that it "sometimes" does?

Dr. ENGLER. A pollutant by definition is a substance that will result in environmental or ecological degradation or damage when the substance is placed into the ecosystem by some means. To-date, in spite of numerous studies, there has been no documentation of long-term chemical or biochemical ecological damage due specifically to the open-water discharge of dredged material. Impacts that have been documented are the physical changes in bottom topography such as mounding of dredged material on the bottom and the short-term turbidity due to suspended materials. The biota located at the specified discharge sites are obviously physically impacted by this covering; however, these sites are rapidly recolonized by benthic organisms characteristics of the flora and fauna that prefer the physical characteristics of the deposited sediment (i.e., sand dwelling or mud dwelling organisms). Much of the controversy concerning the "pollutional" characteristics of dredged material has been the assumption that dredged material and sewage sludge are one and the same and should be judged similarly. This assumption exhibits a gross ignorance of sediment geochemical characteristics and the nature of aquatic-sediment environmental systems. Sediments are predominately mineral in nature; 90-100% natural mineral soil material (sand, silt, clay) with an average organic carbon content of about 4% for harbor sediments. Bottom sediments also consist of about 50% solids and 50% water and have an average density of about 1.4 g/cc. On the other hand, sewage sludge is about 5-6% solids and consists of about 50-60% organic carbon with an average density less than 1 g/cc. Even a cursory examination of the two materials will show that dredged material and sewage sludge are in no way similar. We are enclosing for the record several pertinent reviews of literature and published DMRP technical and draft final technical reports that give more than adequate documentation of the mineralogical nature and "pollutional" properties of dredged material. The literature reviews cite instances where dredged material has been used as an agricultural soil and supply background documentation on the properties and characteristics of dredged sediments. The inclosed DMRP reports have evaluated and characterized the "unique" nature of this "waste material" and have clearly separated the problem and nonproblem areas. The reports are the product of numerous laboratory investigations with dredged sediments from many locations. The findings of these studies are being currently evaluated and verified at several field sites around the United States. Results from these field studies will be forthcoming in the next 18 months.

The major documented adverse impact of open-water discharge of dredged material is the alteration of the physical nature of the bottom sediments at the specified discharge sites. Turbidity was noted at the discharge sites; however, the impacts of this suspended particulate are aesthetic in nature and have shown no biological consequence. The only exception would be coral reefs in Hawaii and South Florida.

Mr. MURPHY. Will EIS's be prepared for *all* active dredged material dump sites?

General McINTYRE. As required by the National Environmental Protection Act, an Environmental Impact Assessment (EIA) will be prepared for all active dredge material dump sites to be followed by, in those cases where judged necessary, an EIS.

Mr. MURPHY. What do you mean by the phrase "feasible alternative," as used in the first paragraph of page 5? The implication from the context would seem that you would regard as "infeasible" anything that is "time-consuming."

General McINTYRE. The infeasibility of artificial dredge islands, due to exceptionally time-consuming inter-governmental coordination, was only one of the restricted limitations I wished to emphasize. You will note in the preceding sentences that I also discussed the often non-availability of upland disposal areas and the environmental concerns of open water disposal in inland and coastal waters and wetlands. Collectively, these restrictions often result in ocean disposal being the only feasible alternative available to the local port

users from both an environmental and economic standpoint. I emphasize, however, that just because one of the other alternatives is "time-consuming," this would not in itself render it "infeasible." I did not intend for any other implication to be drawn from the context of my statement.

Mr. MURPHY. At the bottom of page 8 and top of page 9 you describe the Corps' Dredged Material Research Program.

Is any DMRP research being carried out at deep-ocean dump sites—in view of the fact that 90 of the 94 dumping permits issued by the Corps in FY '74 were for sites beyond the territorial sea?

(If no such research is being carried out, what, if any, plans are being made to do so).

Dr. ENGLER. Chemical, physical and biological research is being carried out at an ocean disposal site off the mouth of the Columbia River, Washington, in approximately 30 meters of water (about 100 feet deep). Due to the prohibitive expense associated with deep ocean research that could conclusively define the effects of the discharge of dredged material, the Columbia River site constitutes the only ocean site under study. Other open-water field sites are located in estuarine riverine, Great Lakes (Lake Erie), and Gulf of Mexico locations. A study has recently been advertised by the DMRP in the *Commerce Business Daily* for proposal to make an "Assessment of the Potential Impact of Dredged Material Disposal in the Open Ocean." The vast majority of open-water dredged material disposal are within the territorial seas. The vast majority of permits were issued for a small number of sites in FY 74. A large number of permits were issued for the New York Bight dump site which is beyond the territorial seas but is not considered a deep ocean dump site. Deep ocean dumping is normally considered to be at least 200 fathoms or deeper.

Mr. MURPHY. On page 9 you state that "We have made significant progress in determining the fate and effects of contaminants associated with dredged material."

What, if any, research has been done by DMRP to date to ascertain the biological availability of heavy metals and other pollutants associated with ocean-dumped dredged material to bottom-dwelling and filter-feeding marine organisms?

Has biological availability to bottom-dwelling organisms ever been directly tested by DMRP?

Dr. ENGLER. There are at least 12 DMRP studies being conducted to evaluate the biological availability of various sediment contained chemical constituents to select bottom dwelling and filter feeding organisms. These studies are listed as DMRP Work Units 1A06, 1A07, 1A08, 1A09, 1A10, 1D06, 1E07, 1D09, 1D11, 1E03, 1E03A, 1E06, and 1E07 in the DMRP Status Summary of 30 December 1975, which I will supply for the record. There are other DMRP contaminant/uptake studies, which I will provide for the record, related to upland habitat, marsh and island development studies that will contribute significant additional information. These studies contain brief descriptions of most of the prior mentioned listed work units. Work Unit 1A10, and 1E03A descriptions were not available at this time but will be in the near future. New work units are currently being developed to place even more emphasis on the biochemical impacts on bottom dwelling organisms. Should a more detailed description of all work units be desired, the complete proposals, contracts, and experimental designs can be furnished. In answer to the second part of our question, yes, the DMRP has directly tested and is currently testing the biological availability of sediment contained contaminants to bottom dwelling organisms. I'll provide for the record all published DMRP reports and reports in press as of 1 February 1976 that may also be helpful to the Committee.

(The material listed above follows:)

#### RESEARCH ON NEW YORK BIGHT DUMPSITE

Prior to adoption of the Marine Protection, Research and Sanctuaries Act of 1972, increasing concern over the effects of marine waste disposal in the New York Bight, prompted the Corps to study monitoring offshore disposal activities in the Bight to determine impact on the environment. The primary objectives of the Corps of Engineers in funding such research investigations were the following:

a. The determination of the impact of waste disposal activities in the Bight on water quality, safety, water use, ecology, fish and wildlife, conservation and recreation.

b. The development of scientific information that could assist the Corps with management decisions for regulating and monitoring effectively the disposal of wastes in the coastal waters of the Bight.

c. The acquisition and scientific interpretation of data that would permit the writing of an accurate EIS on the effects of waste disposal on the marine environment of the Bight.

Topics that required investigation were too numerous and complex for a short-term study. It was realized that to properly assess the long-term effects, long-term interdisciplinary investigations would be required. However, it was judged that interim studies would provide a more detailed and accurate environmental description of the ocean dumping grounds than had been available, and would assist in determining the lateral and vertical distribution of waste materials. Additionally, it was anticipated that these studies would identify, and possibly quantify the environmental and ecological effects of ocean dumping, and separate and assess the effects and impact of other land-based pollutant sources on the coastal environment of the Bight (sources such as municipal sewer outfalls and industrial discharge pipes).

To meet the objectives previously outlined and to acquire the data that would permit the assessment of the impact of ocean waste disposal in the Bight, the Coastal Engineering Research Center of the United States Army (CERC), proceeded with a comprehensive study. Much data was gathered primarily on the physical, chemical, and biological characteristics of the waters and sediments of the New York Bight, as related to disposal of waste materials, such as sewage sludge, dredge spoils and acid-iron wastes. The studies summarized in the CERC report were supported by the Corps of Engineers under contracts with the Smithsonian Institute, the Sandy Hook Marine Laboratory of the National Marine Fisheries Service, the State University of New York at Stony Brook, the Woods Hole Oceanographic Institution and the Sperry Rand Corporation.

The studies, completed by 1972, included hydrographic, geological, chemical, biological investigations, and a feasibility study for a remotely controlled sensing system that could assist regulating agencies in detecting the location and dump status of waste disposal vessels operating in the New York Bight. The studies supported by CERC generated valuable data related to the disposal of sewage sludge, and acid-iron wastes, with some emphasis on dredged material disposal, and have helped provide a more detailed and accurate environmental description of some of the New York Bight dumping grounds than had been available. These data suggest that the large volume of wastes being dumped states that due to the limited scope and funding of the short-term investigation in the Bight and frequency of dumping has changed the marine environment of the dumping grounds and adjacent areas. The possibility of pathogenic and chemical damage to finfish and shellfish from the disposal of waste materials, is a point which has not been answered, but which carries health implications requiring extensive field and laboratory investigations.

The studies noted that complex physical, chemical and biological processes and interactions, which are not completely understood, are at work and are responsible for the accumulation, dispersion dilution, biodegradation, or removal of waste materials and their components from the marine environment of the New York Bight. Although preliminary research work has contributed to a basic understanding of the environmental impact of dumping in the present waste disposal grounds of the New York Bight, it has left many questions unanswered and has raised new questions. This work has assumed that most of the observed adverse effects on the marine environment of the Bight are the direct result of ocean dumping, while other important sources of pollution are known to exist. Although it is difficult to assign responsibility to any class of pollutants, untreated sewage from coastal sources, agricultural and urban runoff, atmospheric precipitants, thermal discharges, and oil spills may all be responsible for adverse environmental effects in the New York Bight. The areal extent and magnitude of change resulting from ocean dumping and from other sources of pollution in the Bight remain to be demonstrated, separated, and quantified.

The CERC report, "Ocean Dumping in the New York Bight: An Assessment of Environmental Studies"—Technical memorandum No. 39, dated May 1973, contains findings completed in the CERC investigations, the long history of waste disposal, and the absence of baseline data, the basic mechanisms by which ecological changes occur in the marine environment of New York Bight remain essentially unknown. Comprehensive, long-term interdisciplinary studies will be required to determine the extent of these changes. On the basis of data obtained, it was not recommended that the dumping grounds of the New York Bight be shifted to new locations on or beyond the Continental Shelf without adequately studying the long-term effects of waste disposal on the marine environment.

Mr. MURPHY. On pages 9 and 10, you take the position that the Corps' present regulatory scheme "substantially incorporates the requirements of both the MPRSA and the Ocean Dumping Convention," and that the only modification required of the present ocean dumping criteria is that needed to bring it into full "technical" compliance with the Act.

Do you regard a provision that all ocean dumping of dredged material *will* be approved unless shown to be harmful as "substantially" complying with the MPRSA's prohibition against allowing any dumping not shown to be safe?

Why, if the law really is being complied with, are representatives of the New York district assigning polluted dredge spoils to ocean dump sites, not in spite of their being polluted, but *because* they are polluted?

General McINTYRE. The provision to which you refer, while reflected in EPA's ocean dumping criteria, is not reflected in the Corps public interest review. Thus, while the ocean dumping criteria serve as a decision-making tool, the ocean disposal of dredged material is also subject to an overall public interest review. Environmental data generated by the environmental assessment, and when appropriate, EIS also assists in this public interest review as well as comments received from appropriate Federal and State agencies under the Fish and Wildlife Coordination Act, NEPA and the Endangered Species Act. This information may well lead to the decision that the ocean disposal should not occur. Thus, this provision of the criteria does not reflect the complete decision-making process associated with the ocean disposal of dredged material.

Regarding your question concerning the New York District's use of ocean disposal for polluted dredged material, I assume you are referring to a single public notice dated 27 September concerning maintenance dredging in the Hudson River. In the description of work the Corps gave public notice that, "A sample of the material to be dredged was found polluted with respect to its chemical oxygen demand, oil, grease and metallic content, as indicated by a Shaker Test analysis submitted by the applicant." As required by Corps regulations there was extensive coordination with other Federal and local agencies, as well as the general public, before the selection of the disposal site was made and proposed disposal proceeded. Tests conducted by the Corps are indicators of possible water quality disturbances. In this particular case ocean disposal was judged acceptable since the overall public interest dictated that the operation proceed and no feasible disposal site existed other than the EPA designated ocean site.

Mr. MURPHY. Has the Corps done any research on the dredged material dumpsite in the New York Bight? What did you find?

General McINTYRE. Sir, I'll provide this for the record.

Mr. MURPHY. Has the Corps been asked by EPA to move its current dredged material site in New York? What was the Corps' response?

General McINTYRE. Yes, but I will have to furnish the details for the record.

#### DETAILS ON EPA REQUEST CONCERNING NEW YORK BIGHT

Yes, in October 1974 the Corps was advised that EPA intended to phase out use of the present New York Bight dump site for disposal of sewage sludge by 1976. The following paragraph from EPA Region II letter of Oct 9, 1974 to the New York District Engineer applies:

"In a letter dated October 2, 1974, copy attached, we reaffirmed our position to municipalities that their ocean disposal permits would not be renewed for the continued use of the present sludge site after 1976. Two new areas have been designated. (See attached map.) The specific location of the new "Interim"

site(s) within these areas, will be designated in 1975 pending completion of ongoing oceanographic and environmental studies."

In this same letter EPA Region II suggested that the Corps phase out use of the present dredge spoil disposal site by 1976, and utilize new interim sites which ranged out to 65 miles to sea.

In response, the New York District Engineer's letter of October 23, 1974 to EPA Region II states in part:

"I note with interest the Federal concern regarding the need to maintain the existing high quality waters contiguous to the beach area of New York and New Jersey, and support programs to maintain those standards. However, to date, I have no firm information that indicates degradation of the present water quality in the area as a result of disposal of dredge spoil in the presently approved Mud Dump site in the Atlantic Ocean."

On November 18, 1974 EPA Region II advised the New York District Engineer that:

"EPA has not at this time designated any new disposal site(s), rather, areas under consideration have been announced. The actual choice of a site(s) within one, or both of these areas, will completely depend upon the results of environmental studies now being conducted by EPA and NOAA. These investigations are scheduled to be completed by August '75, and a decision regarding site(s) location will be made during the latter part of that year."

This exchange of letters continued. One month later, on December 12, 1974 the New York District Engineer further advised EPA Region II that:

"I note that EPA and NOAA's monitoring studies still continue to indicate that use of the present disposal sites do not pose any immediate threat to the waters of Long Island or New Jersey. It would appear reasonable that since the sludge dump site is being relocated, continuation of the dumping of dredge spoils at the present mud dump site should continue and monitored for control purposes. This procedure will allow EPA to ascertain, in-fact, whether disposal in the mud dump has an adverse impact. Should there later be indications that, indeed, adverse impacts especially on municipal water supplies, shellfish beds, wildlife, fisheries or recreational areas are found, disposal at the mud dump site should be terminated. Relocation of both the sludge and mud dump sites at the same time would not afford the opportunity of determining the impacts of the past and proposed continued disposal. Of concern to me, also, has always been the matter of whether or not the chemicals found at the mud dump site indeed are pollutant to ocean waters; the chemicals are generally found in the waters of the Atlantic. Furthermore, to what degree of concentration does a chemical exist that then makes it a pollutant?"

Obviously a question existed as to the effect of dredged material disposal in the New York Bight. Thus, following this exchange of letters the New York District initiated a study regarding possible alternative plans to dredged material ocean disposal with a view toward ascertaining the environmental and economic impacts associated with feasible alternatives. One alternative approach is to dispose of the dredged material in very deep water, at a greater distance than the present open disposal site from the port, as has been advanced by EPA.

New York District has been coordinating this matter with concerned dredging corporations and port development interests. Preliminary indications are that, besides the significant increase in disposal costs resulting from the longer haul, acquisition of new, more costly equipment is required to go further out to sea, and a decrease in economic justification of waterway dredging and port development throughout the Port of New York should be expected.

The only measurable environmental impact to date associated with the disposal of dredged material in the New York Bight has been accumulation of "a 30 foot mound of dredge spoil . . . over a 33-year period" as reported by NOAA (1975). Recent studies have indicated that most of the dredged material dumped at the disposal site can be accounted for based upon estimates of quantities dumped since 1936. In a letter dated 14 March 1975, NOAA concluded that the existing dredged material dump site should not be moved unless navigation is hampered, it becomes a threat to human health; causes extensive damage to the marine organisms, or threatens the safe use of beaches. NOAA stated that current evidence shows none of these conditions exist.

In answering this question I have quoted out-of-context from four letters. Complete copies of these letters are inclosed also for the record.



(The copies mentioned above follow:)

U.S. ENVIRONMENTAL PROTECTION AGENCY,  
New York, N.Y., October 9, 1974.

Colonel HARRY W. LOMBARD,  
District Engineer,  
New York District Corps of Engineers,  
26 Federal Plaza  
New York, N.Y.

DEAR COLONEL LOMBARD: As a follow-up to our discussion several weeks ago, we would like to reaffirm our position relative to resolving ocean dumping problems in the apex of the New York Bight.

As you well realize, the volume of sewage sludge will significantly increase over the next three years, and to the best of our knowledge, the present dredge spoil volume of approximately 11 million cubic yards per year, will not significantly decrease. Taking into consideration the level of pollutants contained in both dredge spoil and sewage sludge—in terms of pounds per year of contamination added to the ecosystem—it is difficult to separate the impact resulting from these individual disposal operations. Thus, it is our opinion, based on an assessment of the potential problems which logically might occur if the present disposal sites continue to be used, that the present sewage sludge and dredge spoil sites must be relocated as soon as possible.

In a letter dated October 2, 1974, copy attached, we reaffirmed our position to municipalities that their ocean disposal permits would not be renewed for the continued use of the present sludge site after 1976. Two new areas have been designated. (See attached map.) The specific location of the new "Interim" site(s) within these areas, will be designated in 1975 pending completion of ongoing oceanographic and environmental studies.

This action has been taken in order to protect the existing high quality waters contiguous to the beach areas of New York and New Jersey. Similarly, it is our position, that the present dredge spoil site must also be relocated, since this operation, which at times occurs as close as three miles from the New Jersey coast, can also seriously jeopardize the present and future water quality of the bathing beaches.

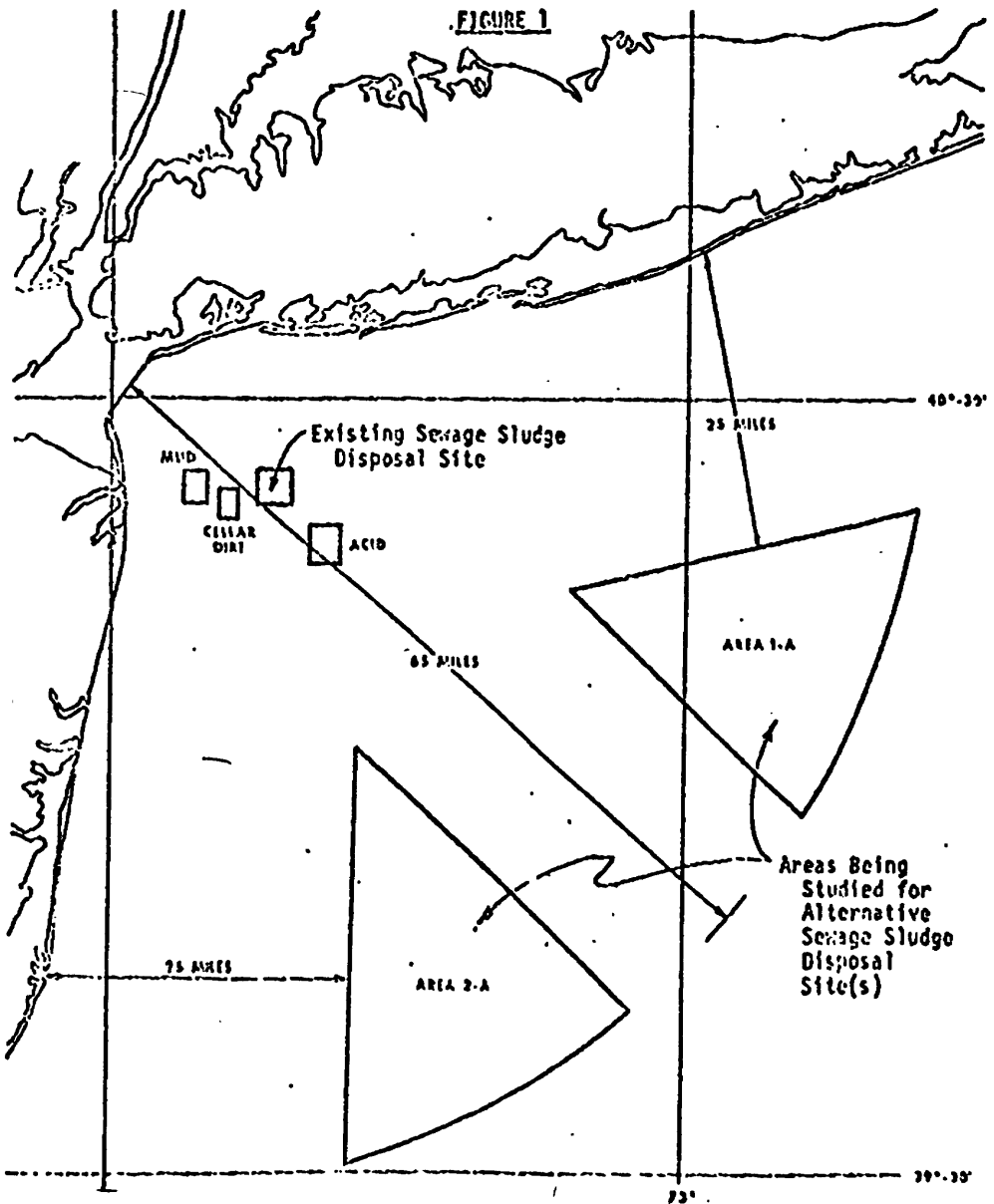
On the basis of these decisions, therefore, it is requested that you submit to us, by December 1, 1974, a plan for phasing out the use of the present dredge spoil disposal site by 1976, and utilization of a new "Interim" site(s) within Areas 1A or 2A. Naturally, any plan you submit should consider the basis for selection of alternate sites, alternatives to ocean disposal, navigational hazards associated with changing sites, the economic impact of this new requirement, and a timetable for implementation.

Even more important, cost estimates for moving to alternate sites should be incorporated in the Corps' Federal budget requests for fiscal years 1976 and 1977, as appropriate. This matter has been discussed with EPA Administrator Train, and EPA headquarters wishes to also immediately open discussions on the issue with Corps headquarters officials.

If you have any specific questions regarding this decision, please feel free to contact me.

Sincerely yours,

GERALD M. HANSLER,  
Regional Administrator.



OCTOBER 23, 1974.

**Mr. GERALD M. HANSLER, P.E.,**  
*Regional Administrator, Region II*  
**U.S. Environmental Protection Agency**  
**New York, N.Y.**

**DEAR MR. HANSLER:** I have your letter of 9 October 1974, regarding EPA's desire to phase out the use of the present dredged spoil disposal site by 1976. I note with interest also the desire of your Agency to establish two additional interim sites.

The overall impacts of the outlined proposals are being coordinated with concerned parties including dredging interests and the United States Coast Guard, Marine Inspection Group, in order that this office may respond to your request regarding information concerning impacts of implementing the program.

I note with interest the Federal concern regarding the need to maintain the existing high quality waters contiguous to the beach areas of New York and

New Jersey, and support programs to maintain those standards. However, to date, I have no firm information that indicates degradation of the present water quality in the area as a result of disposal of dredge spoil in the presently approved Mud Dump site in the Atlantic Ocean.

If such information is available, I would appreciate receiving a report regarding the bases of such a finding. I would further appreciate any data you may have in report form that outlines the environmental impacts associated with using the "interim sites" for both mud and sludge disposal.

Upon completion of all necessary coordination and review of the matter regarding alternatives to the present dredge spoil disposal procedure in the Atlantic Ocean, I will advise your office of our findings.

Sincerely yours,

HARRY W. LOMBARD,  
Colonel, Corps of Engineers, District Engineer.

U.S. ENVIRONMENTAL PROTECTION AGENCY,  
New York, N.Y., November 13, 1974.

Colonel HARRY W. LOMBARD,  
District Engineer,  
U.S. Army Corps of Engineers,  
New York, N.Y.

DEAR COLONEL LOMBARD: This is in response to your letter of October 23, in which you raise several questions about our position to relocate the present ocean disposal sites in the apex of the New York Bight.

a. EPA has not at this time designated any new disposal site(s); rather, areas under consideration have been announced. The actual choice of a site(s) within one, or both of these areas, will completely depend upon the results of environment studies now being conducted by EPA and NOAA. These investigations are scheduled to be completed by August '75, and a decision regarding site(s) location will be made during the latter part of that year.

b. The decision to move the disposal site(s) is based on the potential health threat associated with the continued use of the present disposal sites—dredge spoil and sewage sludge. We clearly recognize that dredge spoil and sewage sludge physically behave differently in the ocean environment; however, from a pollution standpoint, they equally contribute to the actual load—pounds per year—of pollutants added to the ecosystem.

While we agree that bacteriological water quality along the beaches has not been affected by present dredge spoil practices, we believe that organic matter in the water column and the brownish-color of water off Sandy Hook beaches are partially attributable to present dredge spoil disposal practices. However, simply considering the evidence and information on-hand—13 to 98 day travel time from the present sites to the New York shore; three-fold increased in the volume of sludge; close proximity of the dredge spoil site to the New Jersey beaches; lack of tight monitoring and control on the use of the dredge spoil site by private contractors; the need to relocate the present spoil site since the existing "hole" has filled in due to the past 40 years of practice; pollutant levels in polluted dredge spoil—there is sufficient basis, in our opinion, for EPA to act now rather than wait until the problem "hits the beach".

It is evident that we cannot afford to wait for a degradation in water quality to occur before instituting corrective measures. This office has continuously supported the Corps proposal, study and development of the Hoffman-Swinburn project. We will continue to do so for enhancement of future beach water quality, best use of the Gateway National Park, and as a cost-effective method of dredge spoil disposal.

If you have any additional questions, please feel free to contact me.

Sincerely yours,

GERALD M. HANSLER, P.E.,  
Regional Administrator.

December 12, 1974.

Mr. GERALD M. HANSLER, P.E.,  
Regional Administrator,  
U.S. Environmental Protection Agency,  
Region II  
New York, N.Y.

DEAR MR. HANSLER: I have your letter of 13 November 1974, concerning EPA's views regarding the need to relocate the present dredge spoil disposal site in the Atlantic Ocean. This office notes that there is no firm information indicating that the present discharge of such material into EPA's designated cite at Longitude 73° 51' W and Latitude 40° 24' N, has had an unacceptable adverse effect on municipal water supply, shellfish beds and fishery area, wildlife or recreational areas.

This office is coordinating the mater with various concerned dredging corporations and port development interests. Preliminary indications are that modification to existing disposal plant will be required including acquisition of new costly equipment to go further out to sea. In addition, increased costs are anticipated that could significantly affect economic justification of waterway dredging and port development throughout the Port of New York.

Special effort is being given in connection with our study regarding disposal of dredge materials in the Hoffman-Swinburn Island area of which your office has knowledge. This study is scheduled for District completion by December 1975. This office as indicated in previous communication, has expressed support for maintaining the existing high quality waters contiguous to beaches of New York and New Jersey. I note that action is being taken by EPA to have sludge disposed further offshore of the mainland. However, I note that no conclusive evidence exist regarding adverse impacts associated with deisposal of dredge materials at the present mud dump site.

I note that EPA and NOAA's monitoring studies still continue to indicate that use of the present disposal sites do not pose any immediate threat to the waers of Long Island or New Jersey. I would appear reasonable that since the sludge dump site is being relocated, continuation of the dumping of dredge spoils at the present mud dump site should continue and monitored for control purposes. This procedure will allow EPA to ascertain, in-fact, whether disposal in the mud dump has an adverse impact. Should there later be indications that, indeed, adverse impacts especially on municipal water supplies, shellfish beds, wildlife, fisheries or recreational areas are found, disposal at the mud dump site should be terminated. Relocation of both the sludge and mud dump sites at the same time would not afford the opportunity of determining the impacts of the past and proposed continued disposal. Of concern to me, also, has always been the matter of whether or not the chemicals found at the mud dump site indeed are pollutant to ocean waters, the chemicals are generally found in the waters of the Atlantic. Furthermore to what degree of concentration does a chemical exist that then makes it a pollutant?

I trusts the foregoing meets with your approval.

Sincerely yours,

HARRY W. LOMBARD,  
Colonel, Corps of Engineers, District Engineer.

Mr. OBERSTAR. Mr. Sarbanes, any additional questions?

Mr. SARBANES. No.

Mr. OBERSTAR. Counsel?

Mr. SPENSLEY. As I understand the regulations, they require that dredge material be classified as either polluted or unpolluted.

My understanding further that such classification has not been since 1970.

Has any classifications been made of these materials since 1970?

Mr. HEDEMAN. Are you referring to the corps regulations or to EPA's ocean criteria?

Mr. SPENSLEY. I am referring to the criteria.

Mr. HEDEMAN. Those are criteria that we are presently using to evaluate, on a case-by-case basis, ocean dredged material. These

criteria, as has been represented to this committee in past weeks, is being revised now, and will probably be republished in the immediate future.

Mr. SPENSLEY. To answer my question, has there been any classification of dredge material as either polluted or unpolluted?

Mr. HEDEMAN. I do not think we are in a position to answer that question at this time. We would try to furnish that for the record, but this would require review of individual permits. We could possibly canvass the field and supply that for the record.

Mr. OBERSTAR. If there is no further questions, thank you very much, General, for a very enlightening presentation.

We appreciate having you very much.

Our next witness is Rear Adm. Robert I. Price, Chief, Office of Marine Environment and Systems, U.S. Coast Guard.

**STATEMENT OF REAR ADM. ROBERT I. PRICE, CHIEF, OFFICE OF MARINE ENVIRONMENT AND SYSTEMS, U.S. COAST GUARD; ACCOMPANIED BY CAPT. FREDERICK P. SCHUBERT**

Mr. OBERSTAR. Admiral Price, we have your full complete statement which we will include in the record, and if you would prefer to summarize, to save time, you can do that, and then we can proceed to questions, or you may proceed to read the entire statement, as you wish.

Admiral PRICE. Thank you, sir.

The statement is not very long, and since I did not come with it in a further condensed form, perhaps if I read it—

Mr. OBERSTAR. You may read it if you wish.

Admiral PRICE. Yes.

Mr. OBERSTAR. And would you identify your colleagues?

Admiral PRICE. Yes.

Gentlemen, I am Rear Adm. Robert I. Price, Chief, Office of Marine Environment and Systems, U.S. Coast Guard; and with me is Capt. Frederick P. Schubert, who is Chief of the Marine Environment Division under my office.

It is a pleasure for me to appear before you on behalf of the Coast Guard to discuss our activities pursuant to the Marine Protection, Research, and Sanctuaries Act of 1972.

Under title I of the act, the Coast Guard has been delegated the responsibility to conduct surveillance and other appropriate enforcement activity to prevent unlawful ocean dumping. More specifically, we see our role as that of ensuring that ocean dumping is conducted under an effective Environmental Protection Agency [EPA] or Corps of Engineers [COE] permit, or COE "statement of findings," that the material is dumped at the site and in the manner specified within the permit, and that the material meets the criteria outlined in the permit.

Our enforcement program objective is close surveillance of the transportation and dumping of "toxic" materials—those materials dumped at EPA's toxic waste sites—and spot checks of all other disposal activities.

Surveillance methods operationally available include the escort or interception of dumping vessels by Coast Guard vessels or air-

craft, the comparing of dumpers' logs with permits and Coast Guard notification and sighting logs, the use of shipriders to ascertain position and dumping rate, and, in the San Francisco area, the use of available vessel traffic services, VTS, radar.

From April 1973, through September, 1975, 710 toxic and 19,505 nontoxic dumps were reported to the Coast Guard; 1,431 ocean disposal surveillance missions were conducted during that period; 40 violation notifications have been referred to EPA for penalty action, encompassing 158 apparent violations. The majority of these violations were failures by the dumpers to notify the Coast Guard properly of their intended departure and estimated time of arrival at the prescribed site.

Almost all of these failure to notify violations occurred in the early stages of our enforcement program and were predictable under a new effort. Only two failures to notify violations have occurred since 1973.

The Coast Guard has continued to emphasize that proper notification is vital to an effective surveillance program, both from an operational and a deterrent standpoint.

Of the remaining violations, only nine involved dumping outside of the prescribed dump site, indicating that "short dumping" is not a significant problem. We have provided for the record a breakdown of the various violations investigated and referred to EPA through October 1975.

We feel our surveillance of nontoxic disposal activity has been generally effective. However, we have not been able to devote the necessary resources to achieve what we perceive as the desired level of toxic surveillance.

Until this fiscal year, resources to carry out our responsibilities under the act have had to come from other Coast Guard programs and missions.

Normal budgetary lags have resulted in field units just being recently provided the ocean dumping requested in 1973.

Although billets have been provided, these have not yet been filled. Efforts are being made to fill these vacant billets as soon as practicable, with officers at selected district offices and, with enlisted personnel having the navigation experience required of ship riders at the appropriate field units.

When this has been accomplished, we believe that we can satisfy the Coast Guard's responsibilities under the act more fully.

Dedicated ocean dumping surveillance and enforcement personnel at our field units will allow us to provide increased attention to toxic surveillance, primarily through ship riding.

The use of ship riders is the most cost-effective method of insuring compliance with provisions of a permit, but this must be supplemented by vessel or aircraft patrols, as sole reliance upon ship riders provides no lasting deterrent.

Our ongoing research and development effort to provide an electronic ocean dumping surveillance system—ODSS—will relieve the requirement for ship riders on all vessels carrying such a "black box."

We do not anticipate requiring the ODSS on board vessels engaged in one-time, or very infrequent dumping, and may exempt

from the requirement vessels operating in areas covered by radar or other continuous surveillance.

EPA presently requires dumpers to submit samples for chemical analysis. There is little or no assurance, however, that the sample submitted was properly drawn, that it was not altered, or that it was even drawn from the load to be dumped.

We have not encouraged sample taking by Coast Guard personnel due to the extensive training and indoctrination that would be required in sampling methods and hazards associated with the certain types of vessels and materials.

As the dump vessel personnel already have the necessary expertise, we feel that the most cost-effective method of discouraging submission of nonrepresentative samples is the utilization of Coast Guard personnel to randomly oversee the sample taking, and certify the samples as having been taken in accordance with EPA instructions.

The Coast Guard's ocean dumping surveillance efforts have been directed primarily toward activity by dumpers holding EPA or Corps of Engineers permits.

Approximately 85 percent of the U.S. ocean dumping is associated with COE Federal dredging projects, which are authorized under statements of findings rather than permits.

The great majority of this activity is conducted by COE vessels.

We are presently involved in discussions with the corps to determine the extent of their supervision of their contract vessels.

If this supervision does not extend to insuring that their contract vessels dispose of dredged material at the approved site, we will, of course, have to expand our present surveillance to randomly monitor these activities as well.

Work on the previously mentioned ocean dumping surveillance system is progressing well. Two prototype systems were installed last summer on two dumping vessels operating out of New York.

One system was installed on board the New York City sewage sludge tanker *North River*; and the other system was installed on board the commercial tug *Stamford*, which periodically transports wastes to the toxic waste site approximately 120 miles southeast of New York.

The systems consist of an automatic Loran C receiver, a clock, and a recorder which records time versus position. The recorded tape can be read by computers at our district offices and, when desired, the computer can provide a graphic display of the vessel's voyage.

Through this data, we can ascertain that the dumper traveled to the proper site and remained for a period of time consistent with his volume and required discharge rate.

We anticipate the addition of a dump valve or dump door sensor to the next generation prototype or first operational system so that the actuation of the dumping mechanism will also be recorded.

The Loran C receivers continually display two Loran C time delays in digital form, so that vessels' navigator has only to apply these readings to his Loran C chart to obtain a rapid and accurate two-line fix.

If and when the ODSS is adopted, our ability to conduct surveillance at night will be greatly enhanced, as we presently are

limited primarily to search and rescue-related resources for night surveillance.

The system will similarly enhance our effectiveness during other periods of reduced visibility when, as at night, unlawful dumping is most likely to occur.

Two factors cause us to view this "black box" surveillance method as only supplemental to present means of surveillance:

First: It is not "real time" surveillance. The recorded data must be retrieved and analyzed after the dumper has completed his mission and returned to port.

Second: And related, factor is the question of the acceptability and sufficiency of the system's tapes as sole evidence. At worst, however, this source of information should alert the Coast Guard to the few dumpers who may warrant closer attention, thereby permitting the most effective utilization of our operational resources.

Obviously, too, it should provide a significant degree of deterrent to international violations.

We believe that the cost per system can be kept below \$10,000.

We expect that the transporter will be required, via conditions within his permit, to purchase and maintain a system. Tapes would be furnished by the Coast Guard. Other expense to the Coast Guard would ensue from computer programing and availability, and personnel for data handling.

Ocean dumping surveillance is part of the marine environmental protection program.

The estimated operations expenses appropriation and expenditure data for surveillance activities from fiscal year 1973 through fiscal year 1976 have been submitted for the record.

In this regard, it should be noted that the \$41,000 provided in the fiscal year 1975 budget presents the first opportunity for the Coast Guard to request funds to meet this new requirement and that until these funds were appropriated, we funded our efforts by temporarily reducing the scope of other important activities.

The fiscal year 1976 budget has \$275,000 for this program. This brings the total directly appropriated funds for this effort to \$316,000. After adding \$22,000 in general fiscal year 1976 cost of living funds to this activity, the total available appropriated funds for the ocean dumping effort is \$338,000. We expect our research and development activities in support of this effort to total approximately \$190,000 in fiscal year 1976.

You have under consideration H.R. 11505, a bill to authorize appropriations to carry out the provisions of the Marine Protection, Research, and Sanctuaries Act for fiscal year 1977.

The Coast Guard has not received authorization for appropriations under the act being amended and, therefore, defers to the views of the Environmental Protection Agency and the Department of Commerce regarding the specific funding of these programs. Funding for Coast Guard activities is appropriated as part of our overall budget in any particular year.

Under title II authority, the Coast Guard continues to cooperate with other agencies—EPA and National Oceanic and Atmospheric Administration—in their research on the effects of ocean dumping and other man-induced changes to ocean ecosystems.



Interagency agreements provide for Coast Guard support in these joint activities. Under title III, providing for designation of marine sanctuaries, the Coast Guard is working with NOAA toward effective enforcement of present and proposed sanctuary regulations.

Thank you, Mr. Chairman, for this opportunity to briefly address you regarding Coast Guard involvement under the Marine Protection, Research, and Sanctuaries Act.

If there are any specific questions, I will be pleased to answer them now or provide you with answers for the record.

Mr. OBERSTAR. Thank you very much for a very comprehensive statement and a very enlightening statement.

Mr. Sarbanes?

Mr. SARBANES. Admiral, do you have any control over whether the dumping takes place either in the daytime or nighttime?

Admiral PRICE. No, sir; we do not.

Mr. SARBANES. Does anyone control that?

Admiral PRICE. It is provided in the EPA permit what the conditions are, sir.

Mr. SARBANES. So taking this Philadelphia situation that has been discussed earlier this morning, I take it their nighttime dumping is much more difficult for you to monitor; is that correct?

Admiral PRICE. Yes; it is.

Mr. SARBANES. Almost impossible, unless you put a shiprider on?

Admiral PRICE. If you put a shiprider on, and that is the primary method—if I may go a step further; where we are dealing with toxic materials; the dumping sites are located a considerable distance offshore.

There are two factors. The vessel is slow-moving, obviously; because it has a tow. It is up against variations in weather conditions and we are dealing, as you know, with a flow problem in disposing of accumulating waste matter. You cannot wait an unlimited amount of time for conditions to improve, unless they are really too bad to proceed at all.

Mr. SARBANES. I take it you are familiar with a statement made in the course of these hearings by the representatives of the General Accounting Office?

Captain SCHUBERT. Yes, sir; we are.

Mr. SARBANES. On page 7 of that statement, they have a heading that starts off: "Coast Guard surveillance of ocean dumping operations has been inadequate."

Then they go on to spell out those inadequacies in some detail. They state some rather cogent facts and I wonder what your response is to those observations on the part of GAO?

Admiral PRICE. First of all, sir, I do not believe that these findings have been formally submitted to the Coast Guard for comment; but we are aware of them and I think in some respects we can respond to them, either now or for the record.

If you will allow Captain Schubert, perhaps he will take a cut at one or two of them.

Captain SCHUBERT. Yes, sir.

Just to examine the first three items on the GAO report, first of all I would like to point out that this represents a survey of the

Coast Guard's surveillance activity in the New York-Philadelphia area where only the Third Coast Guard District has responsibility, and is not representative of activities Coast Guard-wise.

Mr. SARBANES. It is the Third Coast Guard District that is in trouble, if I understand the thrust of that statement.

Admiral PRICE. If I may intercede, the Third Coast Guard District has had its hands full during a considerable portion of this study, with a number of pollution cases, which have been rather significant, including the one in Gowanus Canal.

As I tried to indicate, our resources have to come from some place and there is a question of what is the priority.

I think the problem of a significant oil spill in the midst of the city would hopefully take precedence when having to deal with ocean dumping at the same time.

Captain SCHUBERT. To take the first criticism of the GAO, as to the boarding of ocean dumping vessels, there is no servicewide criteria for this percentage. Our instructions to our field units indicates that they should randomly examine the permits to the dumping vessel but there is no percentage goal as such.

I can only conclude that this 10 percent is in fact a Third District or a local goal that has been established.

Mr. SARBANES. Of course, the observation says no vessels.

Admiral PRICE. Sir, on this same point, it is my understanding that the GAO considers surveillance to include only sightings of ocean dumping vessels when they are actually physically engaged in the dumping operation.

Now, on that basis, the statement may be true, but this is contrary to the operating definition employed by us, which defines "surveillance" as sightings of ocean dumping vessels which are in transit, either before or after the disposal operations.

The point involved is that our objective is to create a deterrent situation. It is not practical to have someone standing at a point 120 miles out at sea in order to try to assure compliance during a period which lasts no longer than 45 minutes.

Mr. SARBANES. Well, if I may interject, I am not sure it is responsive to point 1 of the GAO observation. It says, Contrary to a goal of boarding 10 percent of ocean dumping vessels prior to departure—and I understand you denied any such goal, or if there is any such a goal, it is a local one.

It then goes on to say that no vessels were boarded.

Admiral PRICE. Yes, sir.

Captain SCHUBERT. Yes, sir.

Mr. SARBANES. Do you challenge that?

Captain SCHUBERT. No, sir.

Mr. SARBANES. Why do we not go to the second one?

Captain SCHUBERT. In the second one, I believe Admiral Price had touched on that.

It may become a matter of interpretation as to what "surveillance" means. We have not had an opportunity to review the GAO report. We do not know how they computed their figures.

Our indications are that for fiscal 1975, in the 3d Coast Guard District, we had about 11 percent surveillance of nontoxic dumps. And in the—

Mr. SARBANES. You are responding to point No. 3; is that correct, or the shipriders' point?

Captain SCHUBERT. Point No. 3; yes, sir.

Mr. SARBANES. What about point No. 2?

Captain SCHUBERT. Point No. 2 concerning the shipriders, 7 percent is in fact an accurate figure. This is primarily due to the lack of personnel for this particular mission.

I would like to point out also that shipriders, when they are assigned, are not assigned necessarily to monitor just daytime activities and that the statement that the Coast Guard is not monitoring nighttime activities is not entirely true in that there are shipriders on vessels that do dump at night.

However, as the GAO report indicated in item No. 2, we have not achieved our self established goal on monitoring toxic activities with shipriders.

Mr. SARBANES. What assurances can you give us—just take the Philadelphia and Camden disposal—that it is in fact taking place where it is supposed to take place.

Captain SCHUBERT. If I understand your question correctly, it is: Are we sure that the dumping activities that are reported in fact taking place?

Mr. SARBANES. Where they are supposed to take place.

How do we know that they are not short dumping?

Captain SCHUBERT. We have the shiprider program, obviously. We also have aircraft patrol.

Mr. SARBANES. That is 7 percent; is that correct?

Captain SCHUBERT. Yes, sir.

Admiral PRICE. There is an examination of the dumpers' logs carried out in connection with the other elements, the required notification of departure and return, the overviewing intransit; we attempt to put together this data in order to insure that it makes a consistent case for his behavior.

Mr. SARBANES. Well, now, who reports his departure and return time?

The dumper?

Captain SCHUBERT. He has to report his departure time to the Coast Guard Captain of the Port. He has to report the time that he returns also.

Mr. SARBANES. At the time he returns?

Captain SCHUBERT. Yes, sir. And that is compared against his log.

Mr. SARBANES. Pardon?

Captain SCHUBERT. That is compared against his logs when his logs are returned for Coast Guard examination.

Mr. SARBANES. Is the departure and return time corroborated by the Coast Guard? Can you assure that this ship departed at this time and returned at this time?

Admiral PRICE. We cannot assure you in each and every case this happens.

What we do is dovetail that with other observations which are made of the vessel and route.

Mr. SARBANES. If it goes at night, you do not have those observations?

Admiral PRICE. He is going to make some of this run sir, in daylight; he has to. Proceeding at a speed of 6 or 8 knots for 120 miles out and 120 miles back.

You cannot do that without running in daylight part of the time.

Mr. SARBANES. Does the Coast Guard shift its men from region to region—on what basis, primarily? If region III is overloaded with environmental pollution problems, which I think you had indicated a little earlier; is that a high-priority item within the Coast Guard, to determine the allocation of its personnel, as opposed to other responsibilities which the Coast Guard has and which would determine the way personnel is placed?

Admiral PRICE. Coast Guard regional and district requirements are based on continuing review of our workload but I must say that we will also place the highest priority on safety of lives among our many missions; and we attempt to rank order environmental considerations, to a significant place, in the spectrum of our duties.

Mr. SARBANES. I have no further questions.

Mr. OBERSTAR. Now, Admiral in your statement, you talked about the principal objective of the Coast Guard enforcement program as surveillance of the dumping of toxic materials.

Then, under questioning from Mr. Sarbanes, you said our real objective is deterrence.

Now, which is it, surveillance, deterrence, apprehension, slapping wrists, or what?

Admiral PRICE. Our objective is deterrence. We perceive that is what the Congress wants, obedience to the law.

If we can create an atmosphere where the capability of detection is improved, then we will have obedience to the law. It is not an attempt to fly or operate a number of hours or put in a certain amount of ship time.

It is an attempt to get conformance to the stated requirements.

Mr. OBERSTAR. Along with deterrence comes apprehension, catching a few of them and fining them, imposing penalties. What happened to those 40 violation notifications that you mentioned?

Admiral PRICE. They have been referred to the EPA, which has the responsibility for the subsequent handling of the case.

Mr. OBERSTAR. Is there publicity given to catching of violators or is the word spread by word of mouth and just by the grape vine throughout the trade?

Admiral PRICE. Sir, I think that the dumping trade, a relatively small number of vessels are actually engaged in this on a continuing and standing bases in any particular area, is fully aware of our involvement and our attempts to insure that they conform.

I would say as regards the question of publicizing an arrest, that until you have actually taken an alleged offender to court, if you start making accusations in the press, you do not do anything for your ability to make the case stick.

Mr. OBERSTAR. I then guess that would be EPA's responsibility to prosecute.

But it seems to me unless word gets around that the Coast Guard is tough on these people, they are going to continue to do everything in their power to get away with the most they possibly can.

How do the dump vessels know that they are at or approaching the right site for dumping?

Do they have electronic gadgetry on board, radar, other equipment, to know that they are at the right spot?

Admiral PRICE. Yes, sir; I would expect that they would have the same kind of equipment that any ocean going vessel requires in order to have the capability of fixing their positions.

Mr. OBERSTAR. Does the Coast Guard check the vessel to see what equipment they have in order to know—I mean, they could enter anything on those logs; but if you do not have the right electronic equipment to determine that you are at that spot, those logs do not mean much.

Captain SCHUBERT. Yes, sir; this would be one of the things that the shipriders, who do ride the vessels, would check to see that they have accurate, adequate navigation equipment.

The individual rider, in the course of his duties is required to develop his own position, to confirm what the captain says. Unless that equipment is available to him, he cannot do the job.

Mr. OBERSTAR. Now, on page 5 of your statement, the dump valve or dump door sensor that you are proposing for the so-called next generation of surveillance equipment, appear to be very sophisticated mechanisms.

Is there any way of avoiding that?

Could they have some alternative dump sites, or an alternate dump door that would be so fitted that they could outwit the Coast Guard?

Admiral PRICE. I am sure that a determined outwitter can always outwit if he is bent on doing so. But if he is obliged to make the trip and go the distance, certainly there is not very much incentive to try to indulge in subterfuge by fouling the mechanism.

We feel that if the package is sealed and all elements are there, and it is a case of no-hands operation, that we will get an honest result.

Mr. OBERSTAR. On page 3, you say, "We have not encouraged sample-taking by Coast Guard personnel"—for various reasons.

But is not that really the most effective means of knowing, the surest means of knowing what is on board those vessels and whether they are conforming with the law?

It would seem to me that even for a short period of time, a Coast Guard-operated sampling program would be highly effective.

Admiral PRICE. I think that same end is served if the Coast Guard observes the physical taking of the sample in accordance with guidelines the EPA develops and then insures that the credibility and retention of sample, is validated from that point all the way to the EPA lab.

Mr. OBERSTAR. Counsel, Mr. Spensley, do you have any questions?

Mr. SPENSLEY. This is a question that Madam Chairman Sullivan wanted me to ask.

There has been some recent correspondence with the corps regarding waste materials dumped from a ship that was just outside the 3-mile limit, which is covered by the Ocean Dumping Act.

It does have an impact on the territorial sea. The Coast Guard's answer to the letter indicated that the Coast Guard has not been concerned with dumping as a routine discharge of trash from of a ship.

We further looked at the Commandant's instructions on that matter and found that that also supports your position.

But then looking to the act, we find that the only exception from ocean dumping regulations to discharges from ships is for sewage.

My question is: How do you reconcile the two positions—the act and your instructions?

Admiral PRICE. I am aware of the instance that you are referring to, sir.

I believe that this is a case of a vessel disposing of dunnage and some other materials, if I do not mistake the case involved.

It was viewed by the observer as a threat to the operations of recreational craft.

Mr. OBERSTAR. Yes.

I guess I would rather ask the questions of General Sims, because the regulations concerned me more than the specific instance; and it does not seem to comply with the Ocean Dumping Act.

Admiral PRICE. I prefer to provide you with something for the record on this; because we have come upon this anomaly which requires a little more thorough evaluation.

Mr. SPENSLEY. Would you agree that the act is clear; that only sewage from vessels are allowed to be discharged without a permit?

Admiral PRICE. Oh, there is a stipulation somewhere which deals with operational discharges from vessels.

Now, I mean, that pertains to things like wash water and any other number of things, which we are not referring to. I think that the understanding we have is that this is directed against the disposition of land-provided waste materials at sea.

Mr. SPENSLEY. Well, the act seems clear.

I would like for you to supply an answer for the record. It seems rather straightforward to me; and I was wondering where the stipulation was. It does not appear to be in the statute.

Admiral PRICE. We will try to provide that.

[The following was submitted:]

#### OPERATIONAL WASTES AS DUMPING

The Coast Guard has reviewed the question of whether discharges of vessel-generated "operational waste" such as galley wastes, trash, dunnage, etc. are considered dumping under the act. We are of the opinion that discharges of material taken on board vessels in the United States are not considered ocean dumping under 33 U.S.C. 1411(a), as such material is not transported "for the purpose of dumping it into ocean waters." 33 U.S.C. 1411(b) considers such operational discharges as dumping only when the material is taken on board the vessel from outside the United States and discharged either into the territorial sea, or if into the contiguous zone, only to the extent that it may affect the territorial sea.

It is the Coast Guard's view that the exclusion of sewage and oil from the definition of material in section 1402 does not mean that all other operational discharges are thus automatically subject to ocean dumping regulation. It is our opinion that these two specific exclusions were necessitated by section 1411(b) because it prohibits dumping per se rather than transportation for the purpose of dumping and therefore were necessary to exempt only these specific operational discharges from section 1411(b), as they are adequately addressed under the Federal Water Pollution Control Act. Although other operational discharges fall within the definition of "material," such discharges must still meet the section 1411(a) criteria of being transported "for the purpose of dumping" to be subject to regulation under section 1411(a).

**Mr. OBERSTAR.** Mr. Perian?

**Mr. PERIAN.** We had testimony on January 23, provided to the committee.

**Dr. Michael Champ**, assistant professor of biology, working out of American University, testified, and **Mr. Murphy** asked—if I can read a bit of his testimony and have you comment on it—

Their prepared statement said:

Our experiences in both the New York Bight and off Delaware Bay indicate that violations to dumping regulations are quite frequent.

Is that a general statement, or do you have specific information that you can provide to the committee?

**Mr. Szucs.** We do have specific information, and **Dr. Champ** can back me on this.

The research consortium went into the New York Bight two years ago, and some violations were encountered.

**Mr. Champ** said:

In one of our particular cruises up there, we had 28 barges dumped in about six hours in an area about seven or eight miles across and about four miles deep.

Now, it is dark. All the barges are coming in; and just imagine an analogy of truckdrivers with a CB radio, and what they try to do is keep from hitting each other and dump their load and get out of there.

They come in in a string and they hit an area, and we found, in many cases, we had four or five dumps right on top of each other, different materials. We looked at the building up of the rubble. They have a dumpsite labeled the "One Man Stone Site," and this is large pieces of concrete. This turned out to be dumped in the acid waste dump site.

This is like a bunch of hogs running in a big pen to be fed. It is very hard to go in and determine the discreet effects from one particular waste dump versus another, when, in many cases, at night they are dumped together.

Do you think that stated the case or do you dispute this?

**Admiral PRICE.** According to the information I have out of New York, there are some 14 vessels which have permits by the EPA. It was rather difficult for me to comprehend how they could all possibly be in the same place at the same time.

Moreover, I am not at all sure how the gentlemen involved are able to say that it is a violation if they have not perceived what the conditions of the permit state.

However, if we were given factual material to work from and it is not too old, we would be pleased to try to run the trail as well as we can. I suspect that we will have a great deal of difficulty doing that. It is of some interest that, as far as we can determine no attempt was made by the researchers to acquaint the Third Coast Guard District with the problems.

**Mr. PERIAN.** Well, they presented testimony before this committee in January. The purpose at that time was to indicate those violations to Coast Guard people in the room at that time. This is what they had found.

These alleged 28 violations, if you will let us know about them by the close of business, we would appreciate it.

**Captain SCHUBERT.** Yes, sir; we checked with our Third Coast Guard District and they have no record of receiving a report on this and we do not have the details of what the specific violations were and what the circumstances were, as **Admiral Price** has indi-

cated? If we had those details, we would be happy to followup on them.

Mr. PERIAN. Which confirms your statement of page 5 that it is very difficult to actually monitor these things?

Captain SCHUBERT. Yes, sir.

Mr. OBERSTAR. Mr. Smith?

Mr. SMITH. Yes; I have some questions for the record.

Mr. OBERSTAR. The questions will be submitted for the record and we would appreciate it if the Coast Guard would respond as soon as possible.

[The material referred to follows:]

[Memorandum]

U.S. HOUSE OF REPRESENTATIVES,  
COMMITTEE ON MERCHANT MARINE AND FISHERIES,  
Washington, D.C., February 27, 1976.

To: Rear Admiral Robert I. Price, Chief, Office of Marine Environment and Systems

From: Wayne Smith, Professional Staff (Minority), Oceanography Subcommittee

Pursuant to your testimony this morning during the Subcommittee hearings on H.R. 11505, the Marine Protection, Research and Sanctuaries Act authorization bill for fiscal year 1977, please provide your response to the attached questions prior to Thursday, March 4. While your response should be directed to the Chairman of the Oceanography Subcommittee, John M. Murphy, it would be appreciated if you would send copies of your reply to both Carl Perian and me.

Enclosure.

QUESTIONS FOR THE COAST GUARD

1. Admiral, you make no reference to previous testimony by GAO that Coast Guard surveillance of ocean dumping operations has been inadequate.

Have you had an opportunity to review this testimony? If so, do you have any comments?

2. On page 1 you refer to the Coast Guard's goal of "close surveillance" of the ocean dumping of "toxic" materials.

Admiral, how do you define this phrase?

How many "EPA toxic waste sites" are there that the Coast Guard would regard as requiring "close surveillance"?

Would you regard the sewage sludge ocean-dumped off the New York, New Jersey, and Maryland coasts as non-toxic and undeserving of close surveillance?

3. Also on page 1 you state an enforcement objective of spot checking all non-toxic ocean disposal activities. Yet, on page 4 you indicate that there is presently no Coast Guard surveillance at all of ocean dumping associated with Corps of Engineer dredging projects—no matter how polluted the dredge spoil in question might be.

Is this hands-off approach consistent with your reading of the Coast Guard's statutory responsibilities?

4. On page 2 statistics are provided on the number of "toxic" and "non-toxic" dumps reported to the Coast Guard and on the number of surveillance missions conducted. However, no breakdown is provided as to how much surveillance was carried out in each category.

Admiral, can you supply those figures?

5. On page 2 the assertion is made that "short dumping is not a significant problem." This is based on the fact that "only nine" of the 40 violation notifications referred to EPA involved short dumping.

On what do you base your conclusion as to significance?

Isn't it quite possible that for every nine short dumps detected by the Coast Guard, there may have been fifteen that were not detected?

Isn't it quite possible that many of these short dumps resulted in dangerous pollutants being brought in contact with important surf clam and other commercial fisheries—with possible adverse public health impact?



6. With reference to pages 2 and 3, is the Coast Guard's present level of funding adequate to carry out the Coast Guard's responsibilities not only with regard to the surveillance of wastes which it has arbitrarily classified as "toxic", but also with regard to such highly damaging non-toxics as sewage sludge and polluted dredge spoils?

MARCH 3, 1976.

Hon. JOHN M. MURPHY,  
Chairman, Subcommittee on Oceanography,  
Committee on Merchant Marine and Fisheries,  
House of Representatives,  
Washington, D.C.

DEAR MR. MURPHY: This is in response to a memorandum, dated 27 February 1976, from your Subcommittee, transmitting to us a list of questions regarding the Coast Guard's activities pursuant to the Marine Protection, Research, and Sanctuaries Act (MPRSA).

1. The Coast Guard has reviewed the GAO testimony regarding the adequacy of ocean dumping surveillance and offers the following comments: First, I wish to point out that, as stated in GAO's testimony, the draft report on which they have based their comments has not been reviewed by the Coast Guard for accuracy. I also wish to point out that GAO's comments are based on data acquired from activities within the New York Bight area and do not reflect Coast Guard-wide efforts.

As to specific statements in GAO's testimony:

a. GAO reported that no vessels were boarded, contrary to a goal of 10%. There is no such 10% goal established service-wide; this is obviously a Third Coast Guard District self-imposed goal. Initial Headquarters directives instructed districts to board dumping vessels to ensure that a valid permit was on board and that the dumper understood the provisions of the permit under the administration of the dumping program. The presently effective Commandant Instruction directs that these vessels be checked for valid permits "on a spot check basis." The statement that no boardings have been conducted is obviously erroneous in that GAO recognized that shipriders boarded and accompanied 7% of the toxic material dumping vessels.

b. The GAO testimony states that contrary to a goal of 100%, only 7% of the toxic dumpers were accompanied by USCG shipriders. While the level of toxic surveillance was very low during the period of GAO's audit and may have been 7% in the New York area, figures available to us (from our monthly and quarterly district reports) indicate this effort was 15% for FY 75 Coast Guard-wide. As stated in my testimony, the resources requested for this program are only now becoming available; we expect this level of surveillance to increase dramatically in the very near future.

c. The Coast Guard has established a goal of providing surveillance over 10% of non-toxic dumping activities (i.e., the transportation to and from the site, as well as the actual dumping). GAO stated that only 42, or 1%, of the dumps were observed as compared to a goal of 10%. The Commandant's 10% goal was not intended to restrict this surveillance to observing actual dumping operations. We are interested, as well, in discharges which occur outside of the site boundaries. Four hundred thirty-eight non-toxic surveillance missions were conducted in the New York Bight area during which time 7,758 non-toxic dumps were made. With an average of two sightings on each mission within the New York Bight, we find this surveillance to be over 11%. In conclusion, GAO has misinterpreted or redefined our surveillance goal.

d. GAO stated that the Coast Guard does not carry out surveillance of dumping activities at night. This is not the case, as shipriders are assigned to vessels which dump at night; in addition, the dumping activity in the San Francisco area is monitored by day/night, all weather radar, from dockside to the site and return.

e. In answer to GAO's inference that the Coast Guard requested EPA to allow nighttime dumping, it was the Coast Guard which initially considered prohibition of nighttime dumping beneficial to our surveillance role. It soon became apparent that for reasons of safety and, in some instances, operational necessity, this was not feasible in all cases. This was not a "blanket" granting

of authority for all permittees to dump at night. Numerous dumpers are prohibited from engaging in nighttime dumping.

2. We use the phrase "close surveillance" to indicate 100%, or near 100% coverage. We use the term "toxic" to indicate those materials which warrant the greatest degree of surveillance. In the absence of any other present criteria for determination of this degree, we consider those materials reserved for the EPA-designated "toxic waste" sites as being most critical and deserving of close surveillance. The two sewage sludge sites (off New York and Maryland) do not fall into the "close surveillance" category. There are presently five "toxic" sites in use.

3. I did not mean to give the impression that the USCG provides no surveillance of dumping associated with Corps of Engineers (COE) dredging projects. What I stated was that our efforts were directed primarily (but not exclusively) toward activities by dumpers holding EPA or COE permits. The Coast Guard does not provide surveillance over vessels of the COE, another Federal agency. As pointed out, we are involved in discussions with the COE to determine the level of supervision they provide over their contract vessels to avoid duplication of effort. A large percentage of their contract work is conducted in areas where we have either extensive Coast Guard multimission presence or routine ocean dumping surveillance. Examples are the New York and San Francisco areas where most of the COE ongoing contract dumping occurs.

4. Of the 1,431 surveillance missions, 114 were conducted over toxic dumps, while 1,317 were for non-toxic dumps.

5. Since the effective date of the MPRSA in April 1973 through October 1975, the Coast Guard has reported ten off-site dumping violations to EPA, nine short dumps and one long dump. The comment that this is not a significant problem is not based on a comparison with the total number of violation notifications referred to EPA nor with their possible environmental consequences. It is based on 1,431 surveillance missions over approximately 12% of the 20,215 dumping operations reported in the last two and one half years. Obviously, the actual number of off-site dumps would be larger.

6. The Coast Guard feels that the present level of funding, augmented by that which has been requested through our normal budgeting process, will be adequate to meet our established surveillance goals for all materials with the possible exception of dredge spoils. As pointed out in the testimony, the matter of surveillance over COE contract vessels is presently under review and may require expanded funding if we are to afford it surveillance comparable with that of other "non-toxic" materials.

We hope this is responsive to your request. If we may be of further assistance, please do not hesitate to contact us.

Sincerely,

R. I. PRICE,  
Rear Admiral, U.S. Coast Guard,  
Chief, Office of Marine Environment and Systems.

Mr. OBERSTAR. Any other questions?

Mr. Sarbanes?

Mr. SARBANES. No, sir.

Mr. OBERSTAR. Thank you very much, Admiral, for a very enlightening presentation.

The next and last witness is Dr. B. L. Oostdam, president, Marine Science Consortium, Professor of Oceanography, Millersville State College.

**STATEMENT OF B. L. OOSTDAM, PH. D., PRESIDENT, MARINE SCIENCE CONSORTIUM, PROFESSOR OF OCEANOGRAPHY, MILLERSVILLE STATE COLLEGE**

Mr. OBERSTAR. Dr. Oostdam, you may proceed as you wish. Either present your testimony in full—it will be included in the record—or to summarize it and proceed as you wish.

Mr. OOSTDAM. Thank you, Mr. Chairman.

As a matter of fact, I will read the testimony. I have some statements to add to it.

Mr. Chairman, distinguished members of the Joint Subcommittees on Fisheries and Wildlife Conservation and the Environment and on Oceanography of the Committee on Merchant Marine and Fisheries of the U.S. House of Representatives, it is an honor and a unique opportunity for me to be invited to present some of my views on ocean dumping in context with the Marine Protection, Research and Sanctuaries Act of 1972.

My name is Bernard Oostdam, and I am president of the Marine Science Consortium and professor of Earth Sciences at Millersville State College, Millersville, Pa.

I have been full-time and actively involved in oceanography since 1960, and hold degrees in geology and oceanography from McGill University, Scripps Institution of Oceanography and the University of Delaware.

My experience includes research, education and management in approximately equal parts and ranges from applied marine science problems of mining one of the most desirable treasures, namely, diamonds, from the sea to dumping the least desirable substances, sewage sludge, into the sea.

It is an interesting coincidence that two other scientists can make the same claim: one is Mr. Willard Bascom, former president of Ocean Science and Engineering, presently in charge of the Southern California Coastal Water Research project in the California Bight, who I will quote later in this testimony; the other, Dr. David D. Smith, is well-known for one of the first reports on ocean dumping of solid waste produced under EPA funding.

The Marine Science Consortium is a non-profit corporation consisting of 18 academic institutions in Pennsylvania, Maryland, West Virginia, and Washington, D.C. Operating from its Marine Science Centers in Lewes, Delaware, Wallops Island, Virginia, and Erie, Pennsylvania, the Consortium has conducted a series of research and training cruises, emphasizing the environmental effects of dumping in the mid-Atlantic Bight and Lake Erie.

These cruises, initiated in 1970, ranged from 1 to 14 days and totaled in excess of 60 sea days. Some of the data obtained include trace metal analyses for 8 or more elements on over 200 surfclams, several hundred grab and core samples of sediments and numerous suspended sediment and water samples; grain-size analyses, bottom photographs, records on currents, salinity, temperature, light, primary productivity, and other parameters, both before, during, and after actual dumping operations.

The estimated cost of these cruises and the subsequent data analysis to the Consortium itself, its member institutions, faculty, staff, and students, amounts to \$100,000. Other sources of funding are or have been the city of Philadelphia—approximately \$50,000 to date—the Pennsylvania Science and Engineering Foundation, and the Institute for the Development of Riverine and Estuarine Systems, approximately \$40,000, and NASA, \$10,000.

The combined expenditures of these investigations, therefore, are in the vicinity of \$200,000.

I might note parenthetically that this is about the cost that EPA gives for one of their cruises.

In my testimony, I will try to present and analyze a logical chain of causes and effects which has led to the present less than satisfactory status of ocean dumping.

This proves to be a rather difficult exercise in view of the many complexities and interactions, possible personal bias, and the need to probe deeper than apparently justified by the list of seven suggested questions detailed in your invitation of January 16.

Before proceeding, I want to emphasize that the opinions expressed in this testimony are entirely my own and do not represent the policy of the Marine Science Consortium, Millersville State College, or any of the agencies funding our research.

The establishment of EPA and NOAA in 1971 was one giant step in the right direction towards protection of our overall environment from the consequences of technological growth.

The Federal Water Pollution Control Act amendment, and the Clean Air Act, were evidence of the growing environmental awareness of Congress and the people of the United States in the early 1970's. The Marine Protection Research and Sanctuaries Act of 1972 represented a most commendable effort to save the oceans.

It is obvious that the interpretation and enforcements of these various acts should be closely integrated. This should result in careful consideration of all available acceptable alternatives of waste disposal.

In this process, not only should the anticipated impacts on each environmental sphere—land, air and water—be weighed against each other, but also against economic costs.

EPA officials recognize this, as shown in the following quote from testimony presented to these committees by Mr. Agree in April of 1975, pages 12 and 13, which reads:

EPA regards its responsibilities as covering the entire environment. Within the limits of existing statutory authority, we feel that we must seek out and require the use of the most acceptable environmental alternative for the disposal of waste residues for which additional treatment is not feasible or will not yield significant environmental benefits.

I would like to draw your attention to what I consider the key words in that statement; namely, "within the limits of existing statutory authority."

It is my contention that the MPRSA affords the EPA Administrator too much leeway in the interpretation of the act.

This makes it a potentially dangerous instrument in that final and far-reaching decisions may be based on subjective value judgments, rather than on scientific facts.

Admittedly, scientific facts are often frustratingly contradictory. Most scientists do, however, appear to agree on the need for more data, specifically covering a longer period of time than an impatient legislator or administrator feels warranted.

Thus, the Administrator, caught between litigative actions from both antagonists, environmentalists and dumpers, may feel forced to make or uphold a decision which is inconsistent, premature and biased.

For example, it is truly the intention of Congress, and, as Mr. Murphy mentioned in his opening statement this morning, is it the will of the people, to eventually eliminate ocean dumping of all waste materials, or only potentially harmful substances?

If the Administrator plays it safe, he would phase out all ocean dumping, and receive abundant praise from environmentalists. And from Mr. Sarbanes, as I gathered from him this morning, also. For some obscure reason—possibly Cousteau?—the environmentalists appear much more concerned about the oceans than about land.

Land-based waste disposal alternatives, however, have in common that its potentially harmful substances remains closer to municipal centers. Consequently, they have a much larger impact potential on the population than that of eating seafood, for which I refer you to appendix I.

It is thus left to EPA's discretion what to declare "potentially harmful." Anything is, in large enough doses, or concentrations. In the ocean dumping of sewage sludge, with which I am most familiar, we should realize that more than 90 percent of each bargeload consists of water, almost all the rest of excellent fertilizer benefiting our offshore fisheries, and only a very small fraction of trace elements.

Of the latter, most are naturally occurring, and essential to life in small concentrations. Maximum allowance of concentrations of these trace elements in the barge are prescribed by EPA based on scientifically and statistically questionable criteria, but including considerable safety factors, which represent a tacit admission of our inadequate knowledge of dispersal processes in the marine environment.

I would like to continue using the case of Philadelphia's dumping of treated sewage sludge as an example of EPA's interpretation and implementation of the MPRSA.

I became personally and indirectly involved in research on the city's former dump site off Delaware Bay in 1971, and had, at that time, expected to find the sea floor covered with a "vast blanket of lifeless, stinking sludge," something similar to what Mayor Kelley referred to.

Instead, we never found a trace of sludge which obviously stimulated my scientific interests.

In 1973, when EPA made the city of Philadelphia move its dump area, we rushed to help the EPA make their "baseline study."

We also took the opportunity to initiate a unique study of the recovery rate of a former dump. The logical corollary, that is, the study of the impact on a new dumpsite, proved rather frustrating because of interaction with the adjacent Du Pont acid waste dump, where dumping had been in progress several years.

In our extensive studies, including many grab samples, cores, TV, diver and submarine observations, we never found clear evidence of sewage sludge.

By contrast, the sludge appears to disperse rapidly over a relatively large area. Trace element concentrations in sediments and biota do, however, show some evidence of local concentrations.

A report of EPA studies on the Du Pont and Philadelphia dump sites, published in the spring of 1975, constitutes a veritable treasure chest, or Pandora's box, of questionable scientific interpretations.

On the basis of that report, the region III Administrator decided that Philadelphia would have to phase out ocean dumping by 1981.

In May 1975, in the adjudicatory hearings following Philadelphia's protest, Mr. Russell Train upheld the decision against Philadelphia.

It is noteworthy that scientific evidence did not feature highly in his decision. Instead, reference is made to the need to set an example to the international community.

As a scientist, one wonders why any funds were "squandered" on research and monitoring if a final decision is made for purely political reasons.

Although I fully support the need and desirability of research into alternate methods of waste disposal, preferably recycling, use as source of energy or as fertilizer, I emphatically disagree with the obvious bias shown against considering ocean disposal as a valid alternative.

Ocean disposal should receive equal status with respect to funding of research on its impact, both detrimental and beneficial, both short term and long term.

At least 3 more years of intensive studies should be conducted by reliable, unbiased scientists, before a valid decision can be made, and an immediate reversal of the present premature decision is essential.

EPA and NOAA have not fulfilled their obligations under the MPRSA. They have misinterpreted the intent of the act. They have caused undue hardship to ocean dumpers to force alternate, inadequately tested and impractical land-based waste disposal methods.

Not only have they performed insufficient marine research, but they have not even requested the funding required to perform a bare minimum of research and monitoring.

Some of EPA's results are of such questionable and biased nature that it appears highly desirable henceforth to have research and monitoring performed not by EPA in-house nor, for that sake, by organizations retained by dumpers, but by unbiased third parties. This procedure would also avoid needless duplication of efforts and costs, which is inherent in both dumpers and EPA's monitoring dump sites.

EPA has steadfastly stuck to the concept of stockpiling processes in the oceans, and the fertilizing capacity of sewage sludge.

They have not considered rotating dump sites to allow recovery, analogous to terrestrial crop rotation.

Comments on the performance of the USCG and the USACE have been made by other witnesses. Personally, I am impressed with the USACE's dredged material research program.

As far as funding of all activities under the MPRSA is concerned, I am baffled by its complexity and am utterly surprised about the unaccustomed unanimity of all four agencies involved in not requesting more funds.

Comparing the total sum requested with other Federal expenditures, I strongly doubt that the vital subject areas of the MPRSA

are receiving the priorities in effort and expense which they so richly deserve.

If I may extend my written statement to include some comments on testimony made today.

First: I am greatly disappointed about the fact that it took at least from 1972 until about the end of 1975 for any tangible co-operative effort between EPA, NOAA, and the Army Corps of Engineers to be initiated.

Two: As regards Dr. Martineau's comment that NOAA does not have the capability to do the work, we as early as 1972 proposed a low-cost mechanism to NOAA to study the coast off the Delmar Peninsula, rather than put all their efforts in New York Bight. Today we have not received any comments or consideration on this.

Consequently, it appears that a private, nonprofit corporation; namely, the Marine Science Consortium, has, largely at its own expense, collected more data in this offshore area than NOAA, EPA, and FDA put together.

Three: With respect to Mayor Kelley's spectacular testimony in which he provided you with samples of Ocean City's beach sands. I wished I had brought you some samples of the ocean bottom at the dump site—you would be surprised to see its purity as compared to Mayor Kelley's samples of Ocean City beach.

As a matter of fact, I would challenge Mayor Kelley, I do not think he is here now, to a contest; I'll take one bite of my seafloor sand and he one bite of his beach sand. My prediction is that I will be better off than he would be.

Next, concerning Mayor Kelley, where he attacks a law to transport sludge in Pennsylvania and mentions that "We,"—meaning Ocean City, "are being dumped on.": I would like to find any law which gives Ocean City or the State of Maryland the legal right to consider an area 40 miles offshore as "his territory" or "swimming pool." He must be an awfully strong swimmer to use this pool as should be all the Pennsylvania tourists which favor Ocean City with their presence and their dollars.

I also have very serious reservations about his fishermen's nets getting caught in sludge. We know for a fact that there are considerable deposits of dead shells, including oyster shells, that have been deposited there several thousands of years ago, which would tend to snag nets.

As regards to the statement that there is no life there, in his words, probably that is a bunch of hogwash.

Four: With respect to Mr. Oberstar's comments on the use of sludge as fertilizer, I would like to alert this committee to what happens to the trace elements that are contained in the Milorganite—as well as any fertilizer: they remain close to population centers.

Five: With respect to Mr. Sarbanes' comments on environmental plusses, I would suggest that we consider that ocean dumping of sludge constitutes a large environmental plus with respect to the fertilizing capability of the substance.

Six: In connection with Admiral Price's testimony, I am surprised that the so-called black box was not developed earlier.

I understand that similar devices have been successfully used in the North Sea for several years. The facts that the U.S. Coast Guard

has to use its own funds for the development of this system and that the Coast Guard feels that it should be setting priorities and ranks pollution below other priorities, raises my question again of what happens to the funds which Congress has authorized for expenditures under the MPRS.

Thank you for your attention, and I welcome your comments or questions.

Mr. SARBANES [presiding]. Mr. Oostdam, could you submit for us the members of the Marine Science Consortium?

Mr. OOSTDAM. I would be very glad to.

Mr. SARBANES. I understand that there are 18 member institutions?

Mr. OOSTDAM. That is correct.

Mr. SARBANES. And you are presently the president of the consortium?

Mr. OOSTDAM. That is correct.

Mr. SARBANES. How is the president selected?

Mr. OOSTDAM. Annually, by election, sir.

Mr. SARBANES. How long have you been at Millersville?

Mr. OOSTDAM. I have been at Millersville since 1965.

Mr. SARBANES. Since 1965.

Now, these cruises that were initiated in 1970, do I understand that the total cost that was incurred by those investigations was about \$200,000?

Mr. OOSTDAM. That is correct, sir.

Mr. SARBANES. And 25 percent of that was provided by the city of Philadelphia?

Mr. OOSTDAM. That is correct. And unfortunate in a sense.

Mr. SARBANES. Then the Pennsylvania Science and Engineering Foundation and the Institute for the Development of River, Marine and Estuary Systems provided another \$40,000?

Mr. OOSTDAM. That is correct.

Mr. SARBANES. I am not familiar with those organizations. I would ask you to describe those.

Mr. OOSTDAM. The Pennsylvania Science Foundation is part of the Pennsylvania Department of Commerce and the Institute for the Development of Rivers and Estuarine Systems is a larger consortium which by now is defunct, however, which included the Franklin Institute, Rutgers University, University of Delaware, Princeton, New York University, the Marine Science Consortium, Penn State, and several other institutions, and it probably fell apart because of its size.

Mr. SARBANES. But the Science and Engineering Foundation is a part of the city of Philadelphia Department of Commerce; is that correct?

Mr. OOSTDAM. The State of Pennsylvania, or rather the Commonwealth of Pennsylvania.

Mr. SARBANES. The State of Pennsylvania; I am sorry.

If you were going to permit ocean dumping, how would you decide, since many, many people would like to dump there as being a cheaper means of disposal, who got to dump and who didn't?

Mr. OOSTDAM. I question, Mr. Chairman, whether many, many people would like to dump in the ocean as far as sewage sludge



is concerned; because this will probably be restricted to large size communities.

Mr. SARBANES. How would you determine amongst those communities who would have access to dump?

Assuming that the total number wanting to dump exceeded any capacity in the ocean to absorb?

Mr. OOSTDAM. Again, I must say that I would not quite go along with your assumption.

Mr. SARBANES. Well, let us make that assumption. Why should any large community engage in the expense and the involvement of other disposal methods if ocean dumping is to be available to them?

Mr. OOSTDAM. That is a very well put question.

What I want to point out is that the land based alternatives, in my opinion, have not received sufficient investigation as compared to the ocean-dumping alternative.

I think—and I bring this out in my testimony—maybe not strongly enough—that the land based alternatives are—technically assumed to be the best; but, I think you would agree with it that if there are trace elements and other harmful substances in sewage sludge that they by land based disposal would still remain closer to the citizens than they are by taking them out far to sea.

Mr. SARBANES. I still do not have a response to my question.

If ocean dumping is to be permitted, why should any large municipality engage in the cost and expense and difficult of developing an alternative disposal method?

If there are more communities seeking to use ocean dumping than the ocean can handle, how would you determine which communities are going to have access to that method of disposal?

Mr. OOSTDAM. It is obviously a very difficult question.

If I were a dictator I would not have any doubt whatsoever. I would say that a lot of the money that is being “squandered” on investigating land disposal type stuff is just that; it is squandered.

I think that the oceans can certainly be used and should be used as an alternative. So my point is that there is a bias by this act towards one part of the environment.

Mr. SARBANES. I understand. You still have not answered my question.

My question is, if you are going to make ocean dumping available and if the demands then for ocean dumping exceed the capacity to absorb, how are you going to determine as between those seeking to dump in the ocean, who shall be allowed and who shall not be allowed?

Why should Philadelphia be allowed to ocean dump and some other large municipality should have had to go to the cost and expense of developing an alternative method of disposal?

Mr. OOSTDAM. I would base that probably mainly on economical factors; a case in point, it is much easier for Milwaukee and Chicago to do it right there than to transport it and take it all the way to the oceans. So the ocean shore communities—

Mr. SARBANES. I do not have to use Milwaukee and Chicago to make my point. I can use the large east coast cities. Let us use

Washington, D.C., where the Federal courts compelled that the water disposal of the plants' sewage be stopped and that alternative methods be developed and a number of jurisdictions were required to expend a considerable amount of money in order to develop alternative sources.

Why should they have to go through that?

Why do not they dump in the oceans as well and overload the ocean?

Mr. OOSTDAM. You are putting your finger right on the sore spot. They are being forced to.

If you are forced—which apparently can be done by legislation—this automatically precludes consideration of the other alternatives; and this may be the very gist of my presentation; that you force, for example, a place like the city of Philadelphia to look into alternative methods by making ocean dumping prohibitively expensive and by giving the money to develop land-based alternatives.

Mr. SARBANES. Do you envision that there could be so much dumping in the ocean that you would consider it undesirable?

Mr. OOSTDAM. Sir, as to the amount of dumping in the oceans, if we look at that from a scientific and realistic point of view, the total amount of carbon being metabolized by the entire human race is approximately one-thousandth of that which is metabolized by all organisms collectively in the oceans.

So how do you like to consider that ratio?

Mr. SARBANES. I do not think you have answered my question.

Do you feel that there could be any level of dumping into the ocean that you would object to?

Mr. OOSTDAM. Yes. If we keep on overpopulating the earth I can see that eventually there will be, but that time has not come, and I also fully realize that the impact of ocean dumping is, as you know, localized very much.

Mr. SARBANES. Do you think those municipalities which are now disposing of their sewage by methods other than ocean dumping should shift from those methods to ocean dumping?

Mr. OOSTDAM. No.

Mr. SARBANES. Why not? Why not, on the basis of what you have just said to the committee?

Mr. OOSTDAM. If it happens to be cheaper for them to do so, I think they should give it serious consideration and Congress, under its responsibility for the environment, should allow its effects to be scientifically determined.

Mr. SARBANES. You mean cheaper in economic terms?

Mr. OOSTDAM. Cheaper also environmentally.

Mr. SARBANES. And they ought to shift from their present means of disposal to ocean dumping?

Mr. OOSTDAM. If it could be done cheaper, I say that there will be definite benefit in investigating it.

Mr. SARBANES. What is the consequence of that going to be on the ocean environment?

Mr. OOSTDAM. The consequences on the ocean environment if we are restricting it again to the dumping of sewage sludge, are going to be, in my opinion, more beneficial than harmful.

Mr. SARBANES. You argue in the vicinity of dump sites there has been a beneficial impact on marine organs?

Mr. OOSTDAM. Yes. As a matter of fact, I can submit evidence of that in a statement or publication which Willard Bascom has quoted of the population density near an ocean dump fallout off California where it shows that in the area where the dumping itself takes place, it may kill the organisms; but in an area immediately surrounding it there is actually an enhanced productivity; whereas, further, further off, the effect is negligible.

Mr. SARBANES. So many organisms move from the area where the dumping is taking place, to adjacent areas to escape.

Mr. OOSTDAM. They also in the process change their species, would you submit that?

There is a richer number of species and there is a larger number of individuals in the immediate surroundings.

Mr. SARBANES. Could I come back for a moment to this, before we close, to understand the consortium.

Was the balance of the funding of the \$200,000 to carry out these studies, of which \$50,000 was provided by the city of Philadelphia and the other \$40,000 by the Pennsylvania Foundation; the balance was provided primarily by the member institutions; is that correct?

Mr. OOSTDAM. No; that is incorrect, sir. The balance is mainly the funds that we got ourselves. Let me give you a very brief illustration. Last year, our budget ran to approximately \$800,000, of which \$80,000 was contributed by the member institutions; so it constitutes 10 percent.

The users fee, collected from the college and high school students, amounted to approximately \$300,000; and contracts and research grants constituted the rest.

Mr. SARBANES. Now, I was not trying to get at the total budget of the consortium. I was trying to get at the \$200,000 figure cited in your statement spent on these ocean investigations; and I was trying to ascertain where the other roughly \$100,000 came from.

Did that come from user fees, from students who participated in these projects and things of that sort?

Mr. OOSTDAM. That is partly correct.

Mr. SARBANES. Where did the balance come from? From the member institutions?

Mr. OOSTDAM. The member institutions would also obviously have contributed through this 10 percent that they contribute to the overall budget.

Mr. SARBANES. And you are going to submit for us the list of the member institutions?

Mr. OOSTDAM. Yes, sir.

Mr. SARBANES. Does counsel have any questions? —

Mr. PERRIAN. No.

Mr. SARBANES. Well, thank you very much.

Mr. OOSTDAM. You are welcome, sir.

Mr. SARBANES. The committee will reconvene 1 week from today at 10 o'clock in the morning in the Federal Plaza Building, New York City, to continue these hearings.

[Whereupon, at 1:20 p.m., the subcommittees recessed, to reconvene on Friday, March 5, 1976, at 10 a.m., at the Federal Plaza Building, New York City.]



## OCEAN DUMPING

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FRIDAY, MARCH 5, 1976

HOUSE OF REPRESENTATIVES,  
COMMITTEE ON MERCHANT MARINE AND FISHERIES,  
SUBCOMMITTEE OCEANOGRAPHY AND  
SUBCOMMITTEE ON FISHERIES AND  
WILDLIFE CONSERVATION AND THE ENVIRONMENT,  
*Washington, D.C.*

The subcommittees met, pursuant to notice, at 10:15 a.m., at 26 Federal Plaza, New York, N.Y., Hon. John M. Murphy (chairman of the subcommittee), presiding.

Mr. MURPHY. The subcommittee will come to order.

The committee would like to thank the General Services Administration for providing the hearing room for this morning's hearing; and the General Services Administration has asked me to make an announcement; and that is that there is no smoking in this room and, of course, coffee and the other refreshments are prohibited; but we did provide them for as close to the outside of the room as possible.

This morning the Oceanography Subcommittee and the Subcommittee on Fisheries and Wildlife Conservation and the Environment of the House Merchant Marine and Fisheries Committee conclude their oversight hearings on the Marine Protection, Research and Sanctuaries Act of 1972. It is called the Ocean Dumping Act by most people.

The purpose of this act is perfectly clear. There has never been anything tentative about the goals which Congress set forth in this act.

The goal is to assist in the cleanup of our Nation's rivers, estuaries, and coastal waters by eventually eliminating all ocean disposal of waste materials in this decade.

The act delegates responsibility to the Environmental Protection Agency and the Army Corps of Engineers to regulate and phase out the ocean dumping of sewage sludge, industrial wastes and dredged materials.

Over the past 3 years, since passage of the act, Congress has not been satisfied with the way these 2 agencies have been exercising their responsibilities. That is why we take these oversight hearings so seriously.

Last year, when we held oversight hearings on the act, we determined that over \$5 million would be required for proper implementation of the very strict provisions of the act. However, EPA was forced by the administration to devote only \$1.3 million to this program.

It is totally ridiculous to believe that the goals of this act can be achieved with less than one-fourth the requisite funding.

All of the blame may not lie with the Environmental Protection Agency. I think an awful lot must rest with the Office of Management and Budget. At best, under this policy, we can hope to achieve the goals in four times the amount of time. Unfortunately, I do not think the protection of our ocean waters can wait that long. We must act quickly to reverse the deterioration that has occurred in the last decades.

This year in our oversight hearings, we have again attempted to impress upon the administration the importance we attach to the goals set for in this act. Fortunately, the pressure we have been applying to the administration seems to be working.

In their latest budget request for fiscal years 1977 and 1978, the Environmental Protection Agency has asked for \$4.8 million per year for the purposes of this act. This is much closer to the \$5 million figure we have been authorizing each year for title I of the act.

I am still not convinced that the amount they have requested is sufficient, but I can report today there is some willingness on the part of the administration to comply with the expressly stated will of the Congress—even though it took a great deal of pressure from the Congress again for the Office of Management and Budget to yield.

We have already held extensive hearings in Washington, at which time we heard from the officials charged with the implementation of this act at the national level.

In addition, we heard from environmentalists and scientists who are critical—and they were very critical—of the way the program is being conducted.

We also heard from representatives of the city of Philadelphia, who argued in favor of allowing ocean dumping of sewage sludge, as well as from the mayor and other witnesses from a coastal resort town—Ocean City—where Philadelphia's sludge ends up—who opposed ocean dumping.

Altogether, I think we have heard all the viewpoints that are likely to be presented on this subject.

As a result of these hearings, I have some grave doubts about the dedication of the various responsible Federal agencies to the goals set forth in the act.

There were criticisms of the Environmental Protection Agency that troubled me, which included charges.

First: EPA's own regulations regarding safety levels of mercury and cadmium in waste materials are being constantly violated with EPA's knowledge and forbearance.

Second: EPA's selection of a test organism for bioassays is totally inappropriate. This means that when EPA tests the sewage sludge to be dumped to see whether or not it is harmful to the marine environment, the organism they use is not an organism native to the dumpsite. They use the brine shrimp as their test organism, which is totally inappropriate because the fish and shellfish at the dumpsite would be long dead before the shrimp registered any harmful effects. This is one reason areas of the seafloor in the New York Bight have been found to be totally devoid of marine life.

Third: EPA is lenient in granting permits, inconsistent in its policy of phasing out ocean dumping, and incomplete in its research efforts.

In addition, the National Oceanic and Atmospheric Administration received some criticism regarding the efficacy of their research project on the short-term and long-term effects of ocean dumping on the marine environment, and the adequacy of the cooperation between NOAA and EPA in the area of research.

Criticism of the Army Corps of Engineers has focused on its apparent failure to establish valid criteria for judging the toxicity of dredged materials and deciding which can be dumped and which are harmful to the marine environment.

Finally, the Coast Guard has been charged with a lack of diligence in their monitoring of ocean dumping activities. We heard last month of a case in which 28 violations were observed by a research vessel in a 12-hour period in the New York Bight.

Dr. Michael Champ, Assistant Professor of Biology at American University, and an associate, told the Committee about this incident in his testimony last month, and I will quote from the transcript of that hearing:

Dr. CHAMP. Our experiences in both the New York Bight and off Delaware Bay indicate that violations to dumping regulations are quite frequent.

Chairman MURPHY. Is that a general statement, or do you have specific information that you can provide to the Committee?

Dr. SZUCS. We do have specific information, and Dr. Champ can back me on this. The research consortium did go into the New York Bight two years ago and violations were encountered.

Dr. CHAMP. In one of our particular cruises up there, we had 28 barges dumped in about 12 hours in an area about seven or eight miles across and about four miles deep.

Now, it is dark. All the barges are coming in; and just imagine an analogy of truckdrivers with a citizen band radio and what they try to do is keep from hitting each other and dump their load and get out of there.

They come in in a string and they hit an area, and we found, in many cases, we had four or five dumps right on top of each other, different materials. We looked at the building up of the rubble. They have a dumpsite labeled he "one man stone site," and this is large pieces of concrete. It turned out they were dumping in an acid waste dump site.

This is like a bunch of hogs running in a pig pen to be fed. It is very hard to go in and determine the discreet effects from one particular waste dump versus another when, in many cases, at night they are dumped together.

The satellite photographs on the display board graphically show the magnitude of the acid wastes which were dumped and their movement toward the shores of New Jersey and Long Island from the bight dump site.

This description, coupled with the Coast Guard testimony in Washington just 1 week ago that dumping cannot be controlled at night is a severe indictment of the administration's antidumping program.

The purpose for our trip to New York is to turn for a while away from the administration of the act in Washington and to take a close look at the very urgent and unique problems associated with the disposal of wastes in the New York Bight, a cosmic garbage pile which was perhaps the major reason the act was passed.

In an area of about 20 square miles, 4.1 million tons of sewage sludge, 2.4 million tons of construction debris and 3 million tons of

industrial wastes are dumped each year. And these amounts are increasing every year as the level of treatment of wastes increases in response to other Federal laws.

We will hear testimony from the New York Power Authority today. It will generate 700,000 tons of sludge annually. Where that sludge will be dumped has not as yet been determined. This is just an example of the increase in dumping.

The current dump sites have been in use now for over 40 years. The area has long been characterized as a "dead sea." There has even been concern that the sludge on the sea floor is spreading toward the beaches of Long Island and New Jersey.

Today, 3 years after the effective enactment of the law, the FDA is considering enlarging the area of waters around the bight which are unfit to harvest shellfish, as outlined in blue on the map on display. These are problems which we want to examine thoroughly today.

Earlier this week, the Regional Administrator of the Environmental Protection Agency announced his recommendation that sewage sludge continue to be dumped at the present site until 1981. In issuing a draft environmental impact statement, he concluded that, "The site posed no danger to public health or beach water quality at this time."

We have heard of the recommendation which the Environmental Protection Agency made this week on the proposal to move the sewage sludge dump site which is now 10 miles offshore, further out to sea. NOAA studied two possible new sites, highlighted in red on the map on display of the New York Bight area, and made its recommendation to EPA. I am anxious to hear from the NOAA people here today as to what their recommendation was and on what basis they made it.

I am also interested in what response NOAA has to the claims made a year ago that the sludge was spreading toward the Long Island and New Jersey beaches and whether they took that information into account in making their recommendation.

Administrator Hansler went on to say that monitoring studies indicated no significant impact on water quality off Long Island or New Jersey beaches, and that continued dumping of present volumes of sludge "would not have any additional significant effect on the site."

I am encouraged by EPA's assessment that there is no danger to public health and that beaches have not been affected to date.

However, I have serious doubts about the validity of their assessment. Although continued dumping of current volumes of sludge may not have any effect on the dump site, what about the increasing volumes of sludge being dumped?

What about the estimates that the volume of sludge may triple over these next 5 years?

These estimates are not pulled out of thin air, but are EPA's own estimate, based on the fact that higher levels of treatment will be required at municipal sewage treatment plants under Federal law, and that means much more sludge to be dumped at sea.

Today, we want to focus on this disastrous state of affairs in the New York Bight:



Question. What has been the effect of 40 years of ocean dumping on the waters and living organisms of the New York Bight; is the apex of the bight indeed "dead"? Will it ever recover, if we stop dumping there? What will be the effect on the ecosystem at any new dumpsite? Does EPA intend to eliminate dumping in the New York Bight by 1981 as it had once promised a few years ago? What alternative methods of disposal are being considered for the New York area?

These are some of the questions I intend to pursue at this hearing, questions that are of the utmost importance to the people in the New York-New Jersey area.

Their health is being endangered.

Their fish and shellfish beds are being polluted and declared off limits by the Food and Drug Administration.

Their recreational areas are being threatened.

And every day the problem seems to get worse rather than better.

As I pointed out earlier, with the increased level of treatment required at municipal sewage plants, and the increase of municipal sewage plants, the amount of residue sludge will necessarily increase. We have seen the "Dead Sea" spread since passage of the act in 1972. We have seen shellfish harvesting areas off the south shore of Long Island closed by the FDA due to the spreading zone of pollution.

This state of affairs cannot be allowed to continue.

The administration must carry through on policies established by the Congress.

Alternatives to dumping in the New York Bight must be actively and vigorously sought.

We must and will act to see that the goals mandated by Congress are achieved, and that the pollution of the Nation's waters by ocean dumping is stopped.

The extent of dumping of acid waste is graphically portrayed in the photos of the New York Bight made in 1975 and the satellite photos next to it of chlorophyll and acid in the bight made on April 13, 1975, which are on the display boards here.

We are privileged to have with us today as our first witness Gerald Hansler, the Regional Administrator of the U.S. Environmental Protection Agency in New York.

Mr. HANSLER.

**STATEMENT OF GERALD HANSLER, REGIONAL ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, NEW YORK, N.Y.; ACCOMPANIED BY PETER W. ANDERSON, CHIEF OF THE REGION'S MARINE PROTECTION PROGRAM, EPA; ROBERT C. OLSON, DEPUTY DIRECTOR OF THE REGION'S FACILITIES TECHNOLOGY DIVISION; AND DANIEL SULLIVAN, SENIOR ENVIRONMENTAL ENGINEER, EPA, ENVIRONMENTAL IMPACTS BRANCH**

Mr. HANSLER. Thank you.

Mr. MURPHY. If you would, identify for the record those persons accompanying you.

Mr. HANSLER. Dan Sullivan, who is in charge of putting together the draft environmental impact statement for alternative sludge dumping sites;

Dr. Peter Anderson, our scientist who has been working on ocean dumping for the past 3 or 4 years;

Bob Olson, who has worked with New York State, New Jersey, New York City, and the Interstate Sanitation Commission (ISC) in the development of alternatives to dumping of sludge in the ocean. I have prepared a written statement of some 29 pages, which I will not bother to read. It is for the record. I think this will save time and we will have more time for questions and answers.

We have responded to the 11 questions posed by the subcommittees. If you wish, I could read you the responses to those questions, or continue with the summary of where we are to date in handling the ocean-dumping problem.

Mr. MURPHY. We are going to include your entire statement in the record and would ask you to summarize your statement.

[The complete statement referred to follows:]

**STATEMENT OF GERALD M. HANSLER, P.E., REGIONAL ADMINISTRATOR,  
ENVIRONMENTAL PROTECTION AGENCY, REGION II**

Mr. Chairman, I welcome this opportunity to discuss EPA Region II's activities and progress in administering Title I of the Marine Protection, Research, and Sanctuaries Act (the Act) of 1972. I am accompanied by Mr. Robert C. Olson, Deputy Director of the Region's Facilities Technology Division, and Mr. Peter W. Anderson, Chief of the Region's Marine Protection Program.

EPA Region II became active in ocean dumping activities with passage of the Act in October 1972. The administration of the program has had from its inception a major Regional commitment directed toward meeting the intent of Congress i.e., the ultimate phase out of environmentally harmful ocean dumping practices. In order to meet its responsibilities, the Region implemented a series of programs, summarized in Table 1, with the stated intention to phase out all industrial and municipal ocean dumping by 1981. These programs deal with several important and related aspects of ocean dumping: 1) permit issuance; 2) development and implementation of alternatives; 3) comprehensive monitoring; 4) evaluation of environmental impacts on the marine ecosystem; and (5) enforcement. In FY 1976, six man-years were allotted by Headquarters for this program. However, eighteen man-years were devoted to administer this program; five for permit issuance, one for development of alternatives, ten for comprehensive monitoring, one for evaluation of environmental impacts, and one for enforcement. We also received administrative and technical assistance from Headquarters and the Office of Research & Development.

**PERMIT ISSUANCE AND ALTERNATIVE STUDIES**

Promulgation of interim regulations in April-May 1973 for the transportation for dumping and the dumping of material into ocean waters served as the basis for the Region to develop its permit program. Initially, individual dumpers were identified with regard to the quantity and types of waste being ocean dumped. Site visits were made to each individual dumper to determine the immediate need for continuing this practice and the availability of environmentally acceptable alternatives. Based upon these evaluations, forty-seven (47) industries were immediately required to phase out ocean dumping. Industries, where immediate alternatives were not available, were issued permits that required all liquid wastes, except acid waste, to be dumped at the 106-mile chemical waste site. Prior to this decision, most of these wastes were dumped at the nearshore 12-mile sewage sludge site. It is important to recognize that Region II has not issued a permit to any municipality or industry in the New York-New Jersey area, except those which were ocean dumping prior to 1973.

Permits to those dumpers (municipal and industrial), where alternatives were not readily available, were issued in April 1974 under final regulations promulgated in October 1973. Issuance of these permits required that the permittees submit detailed engineering reports outlining alternatives to their current practice of ocean dumping and establish an approved schedule to implement an environmentally acceptable alternative. In addition, the permittee was required to submit on a monthly basis physical, chemical, and biological data needed for technical/environmental impact assessment. No such requirement existed prior to the effective date of the Act.

Since initiation our permit program in April 1973, we have received requests from 134 applicants. This figure does not include the many potential applicants that were discouraged by my staff from making formal application.

Within the Region, the permit process, which includes an annual public review of information furnished by the applicant, has been effective in moving us toward our ultimate phase out goal. At the most recent industrial public hearing (June 12, 1975), it was our pleasure to report that in FY'74-75 fifteen (15) industrial dumpers (Table 2) in the New York Bight representing an annual permitted volume of 37.8 million gallons were phased out mainly in accordance with permit conditions. An additional four (4) industries with an annual permitted volume of 37.0 million gallons were phased out by the end of CY'76. The public also was informed at the aforementioned hearing that implementation plans mutually agreed upon between EPA and the industries will result in the complete phase out of all but six (6) industries by July 1, 1977. The remaining six (6) are scheduled to implement alternatives or bring their wastes within ocean dumping criteria by 1981. Table 3 summarizes the current status of industrial permits without the New York Bight.

In addition, nine (9) industrial permittees in Puerto Rico (Table 4) are under implementation schedules to phase out their current practice of ocean dumping by 1978. With regard to these industrial permittees in Puerto Rico, three (3) have submitted a scheduled alternative scheme. The six (6) remaining industries have indicated a firm commitment to participate in the Barceloneta Regional waste Treatment System (BSTP). Based on our evaluation of alternatives presently available to these industries, permits were issued on an interim basis pending evaluation and implementation of pretreatment prior to connection with the Barceloneta Plant or the development of other treatment alternatives. Issuance of ocean dumping permits to these six (6) industries will not permit them to utilize the BSTP or any other alternative in violation of any environmental laws.

The Region also is pursuing through the permit process an orderly program aimed at identifying those land-based alternatives best suited for the disposal of municipal sludges. Our program in this regard was initiated prior to enactment of the Act. In 1971, for example, approval of construction grants for wastewater treatment plants was based upon the condition that the grantee would abandon ocean dumping when a more desirable disposal method is made available through the efforts and/or requirements of EPA, State, and regional authorities.

In June '72 the Region funded a 4-year investigation by the Ocean County (NJ) Sewerage Authority, the New Jersey State Department of Environmental Protection, Rutgers University, and the U.S. Geological Survey of the land application of sewage sludge to increase productivity in the relatively sterile soils in the Pine Barrens of southern New Jersey. This study is providing useful data on increased vegetal productivity for wildlife management and on the potential environmental problems associated with percolation of nutrients and heavy metals into the groundwater reservoir. Such information is needed in order that a sound decision can be made with regard to the protection of potable groundwater supplies in Long Island and southern New Jersey, if land application were practiced.

In June '74, the Region, in conjunction with the States of New Jersey and New York, initiated a program for the development of land-based alternatives to ocean dumping of municipal sludges in the New York-New Jersey metropolitan area. All municipal ocean dumping permittees in the metropolitan area are required by permit conditions to either participate in the sludge disposal management plan developed by the program or develop their own alternative disposal method. The Interstate Sanitation Commission (ISC) was designated as the agency to conduct an EPA-funded study to determine feasible and environmentally acceptable alternatives for the area.

The first phase of the study, a technical examination of applicable alternative methods, was completed in June '75. A copy of this Phase I Report is included with this statement. The report recommended two basic disposal systems for the metropolitan area: (1) filter-press dewatering of sludge and incineration and/or eventual pyrolysis with maximum energy recovery, and (2) land application where sufficient demand exists for a soil-conditioner or fertilizer produced from sludge, and where the application rate amply protects public health and welfare. This Phase I Report concluded that the pyrolysis system could not be implemented before 1985. However, the less favorable alternative, using multiple hearth incinerators which could be converted to pyrolysis units, could be implemented by 1981 provided that no major legal-institutional problems develop. Factors considered in this recommendation included environmental impact, economic feasibility, and energy recovery. Current estimates indicate that the implementation of the pyrolysis process would cost about one-half billion dollars. The Phase I Report also recommended that a small scale, pilot study of pyrolysis be started immediately to develop engineering design parameters needed prior to full-scale demonstration. Such a one-year study, to be funded this fiscal year in the order of \$150,000-200,000 through EPA-ORD, will be conducted at an existing pyrolysis plant located in Belle Mead, New Jersey. It is anticipated that useful data will be available four months after the contract is awarded.

Phase II, which is scheduled for completion in July '76, will provide an in-depth evaluation of the environmental, economic, and technical aspects of alternatives recommended in Phase I. Site locations, capital, and operating costs, energy recovery, and an environmental impact assessment will be established in a technical plan for regional sludge management.

A third phase also underway and scheduled for completion in July '76 will develop the legal and institutional arrangements for the authorization and administration of the operating program identified in Phases I and II.

The completion of this three-phase comprehensive study will provide the framework for implementation of a sound program of land-based alternatives to ocean dumping of sludge in the metropolitan area. In order to continue our policy of maximizing public participation in the Region's ocean dumping decision-making process, we plan to assess through the Environmental Impact Statement (EIS) process the environmental and economic trade-offs associated with any proposed actions.

The current municipal permittees and volumes of sludge permitted to be dumped are summarized in Table 5.

Volumes dumped at New York Bight and Puerto Rico dump sites during 1973-75 are summarized in Table 6.

#### COMPREHENSIVE MONITORING

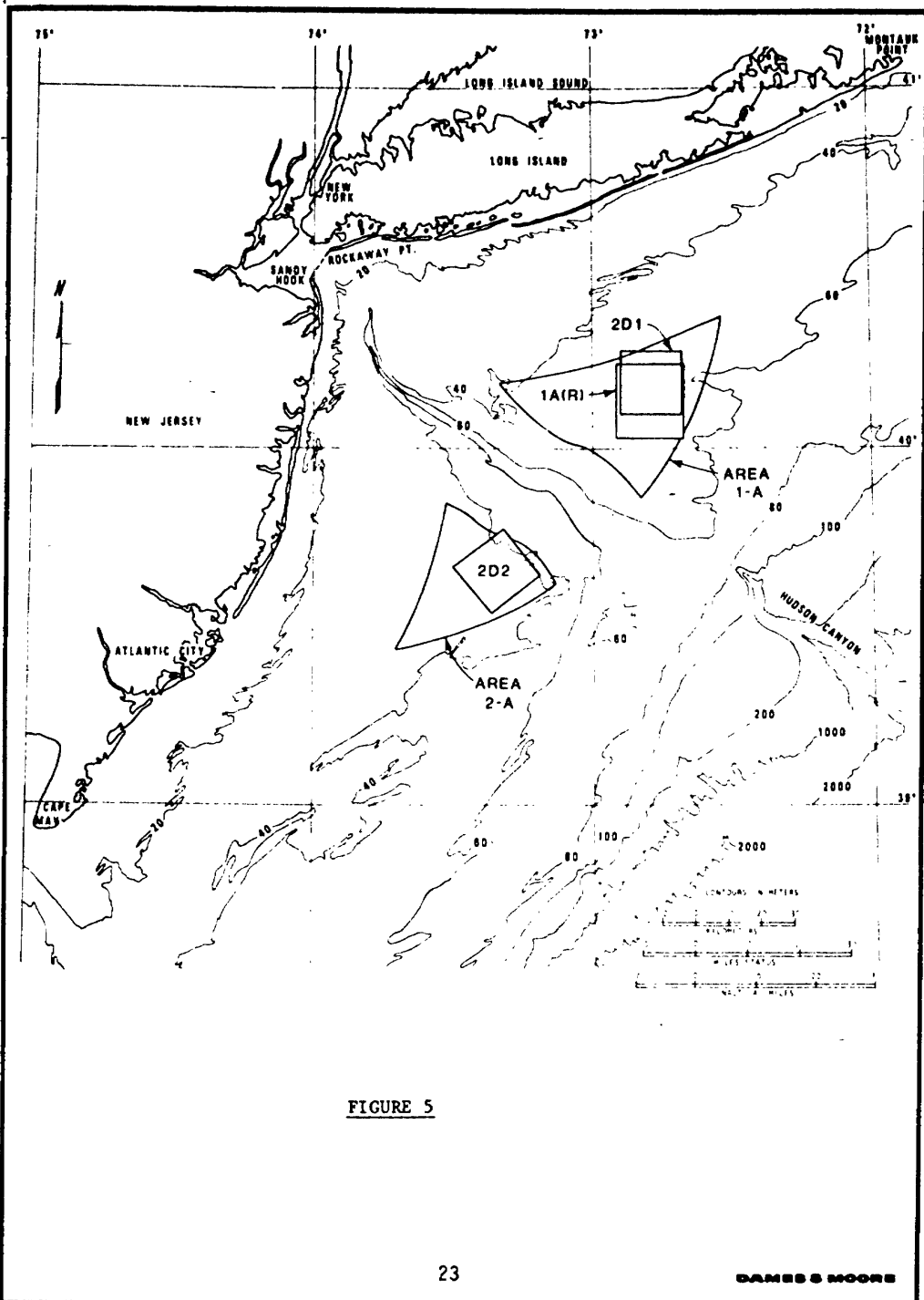
Region II continues to be seriously concerned with the impact of ocean dumping on the marine environment and along the bathing beaches of Long Island and New Jersey. In December '73, there were reports that sludge dumping at the 12-mile sewage sludge site was threatening the quality of important bathing beaches along the shores of Long Island and New Jersey. EPA Region II, along with the National Oceanic and Atmospheric Administration (NOAA), the Food and Drug Administration (FDA), and State, County and local agencies, immediately mounted coordinated field and laboratory studies to monitor the chemical and bacteriological quality of water and bottom sediments in the New York Bight Apex and along the coastal areas. Such studies have continued on a routine basis to monitor environmental quality changes associated with ocean dumping and other sources of pollution. Data generated from these studies (1973-75) have shown that there is no immediate health hazard to contact recreation and that the leading edge of the sludge mass associated with the 12-mile sewage sludge dump site is located about  $5\frac{1}{2}$  to 6 nautical miles from the nearest shoreline. Plans have now been implemented to expand this monitoring program to include the collection of samples for virological analysis. Data collected by EPA to date are contained in two reports included with this statement.

NOAA, through its Marine Ecosystem Analysis (MESA) program, has established a comprehensive monitoring program to evaluate the long-term environmental impact of pollutional loadings in the New York Bight. Close coordina-

tion between the NOAA-MESA and EPA staffs are being maintained; in fact, there is almost daily telephone communication between my staff and the NOEE-MESA office in Stony Brook, Long Island. The environmental data collected by the NOAA-MESA project have proved to be invaluable inputs to this Region's decision-making process.

#### EVALUATION OF ENVIRONMENTAL IMPACTS ON THE MARINE ECOSYSTEM

Early in our ocean dumping program we initiated an assessment of future needs and problems associated with the handling of municipal sludge in the New York-New Jersey metropolitan area. It became clear that the construction of new and improved wastewater treatment facilities under Public Law 92-500 and scheduled for completion between 1977-80 would increase three-fold the amount of sludge requiring ocean dumping. EPA, along with NOAA, recognized the potential environmental problems associated with handling this significant increase in volume at the existing sludge dump site; particularly the potential adverse impacts that might occur to coastal water quality along Long Island and New Jersey. Thus in late 1973, EPA, with the cooperation of NOAA, began to consider the possibility of designating an alternate sludge dump site for use pending development and implementation of alternative disposal methods. These early efforts resulted in the development of criteria for selection of a new site. In general, these criteria included the following considerations: a) on-shelf dumping should be considered because of the unknown environmental risks associated with off-shelf dumping of solids; b) due to economics and logistics the new site should be no more than 65 nautical miles from the harbor entrance; c) location of a new site should minimize the chance of contamination reaching any beaches; and d) the site should minimize, to every extent possible, any adverse effect upon living marine resources. Two potential areas were selected (Figure 5). In early '74, studies were initiated, primarily by NOAA, but augmented by studies conducted by the Raytheon Company under EPA contract, to collect the physical, chemical, and biological data necessary to assess the environmental impacts of ocean dump-



ing in these two areas. In December 1974, Dames & Moore was contracted to prepare an EIS on sewage sludge dumping in the New York Bight. This EIS evaluated, based upon all available data, the potential environmental, economic, and social impact of sewage sludge dumping. Alternative actions such as land-based alternatives, continued use of the existing site or designation and use of a new site were considered. The Draft EIS was recently released. I might indicate that the Draft EIS, in essence, recommends that: 1) the exist-

ing sewage sludge dump site be continued to be used for disposal for current volumes of municipal sludges; 2) an expanded monitoring program and review process be developed to determine when and if environmental factors indicate that the existing sludge dump site should be phased out or abandoned; and 3) an alternate dump site be designated in the Northern Area for potential future use. Public hearings will be held later this month in New York City, New Jersey, and Long Island. The Final EIS, reflecting public comments, will be issued in July 1976.

#### ENFORCEMENT

Under the Act, EPA is responsible for administering enforcement of ocean dumping violations and the U.S. Coast Guard (USCG) is responsible for the conduct of "surveillance and other appropriate enforcement activities to prevent unlawful transportation of material for dumping, or unlawful dumping". To date, the USCG (Third and Eighth Districts) has referred to Region II, information and evidence relating to 134 suspected violations. Most of these USCG referrals were for "failure to notify". Upon examination, the Region determined that, with the exception of five (5) alleged violations, the facts did not warrant initiation of administration action. A "notice of violation" was issued for the five (5) remaining USCG referrals. The results of these enforcement actions, together with those initiated upon recommendation of the Region's staff, are found in Table 7.

Highlights of Region II's ocean dumping enforcement effort includes a \$40,000 penalty assessed against Pollution Control Industries for two (2) short dumps in Puerto Rico and a \$25,000 penalty assessed against Moran Towing and Transportation Company for a short dump in the New York Bight. The respondent in this latter action has appealed this assessment in a case now pending before the U.S. District Court.

With regard to the Region's enforcement activities, you may be interested in a recent development. In coordination with the National Aeronautic and Space Administration (NASA), an evaluation is being made of the potential use of remote-sensing technology for monitoring and surveillance of dumping activities. This preliminary evaluation has already produced a precedent-setting enforcement action utilizing imagery collected by a NASA U-2 aircraft. Mr. Mugler of NASA, who is also on the program, will discuss in greater detail recent developments in establishing cooperative studies on the use of remote-sensing technology and in new techniques for measurement of indicator bacteria.

#### SUMMARY

In summary, the Region's goal regarding the phase out of industrial waste generators is moving ahead rapidly. The complexities associated with land-based alternatives for the disposal of municipal waste are presently under active investigation. Regional policy is to determine an environmentally acceptable land-based disposal method for municipal sludge, rather than to first set impractical to achieve deadlines for the establishment of alternatives which may, in the long run, prove to be more environmentally damaging. However, our common goal is to phase out ocean sludge dumping by 1981.

Air quality, from the standpoint of particulate matter, has improved; but primary Air Quality Standards have not been achieved everywhere in the New York Metropolitan Area Air Quality Control Region. Thus, any land-based alternative, which may affect air quality, must be carefully evaluated. In addition, land for surface disposal is not readily available in the metropolitan area. With 21,000,000 persons living in a 50-mile radius of Manhattan, we just don't have the options available, as do Philadelphia, Chicago, and other cities with nearby farm and forested lands.

Monitoring by EPA, NOAA, and others will continue to assess any potential impact of ocean dumping on the marine environment and along the bathing beaches of Long Island and New Jersey.

Enforcement will continue to be vigorously pursued. Innovative approaches, such as remote sensing, will be employed.

Finally, public participation will remain an important part of our decision-making process. We will, as in the past, utilize the public hearing forum to the maximum extent possible to enable the public to scrutinize our program activities.

TABLE 1.—*Region II Ocean Dumping Program Highlights New York Bight*

1970—COE-NOAA release bight study.

1971—EPA conditions municipal-facilities construction grants to develop land-based alternatives.

1972—EPA-ocean county initiate "land recycling" study: \$300,000, 4 years.

EPA-ORD initiates experimental modeling studies.

1973—MPRSA (Ocean Dumping Act) effective—EPA permit program starts.

EPA segregates industrial and municipal wastes and assigns wastes to specific sites.

EPA initiates one (1) enforcement proceeding.

1974—eight (8) industrial permits/applications are denied or withdrawn.

Forty-seven (47) industrial waste generators are phased out.

EPA initiates three-phase bight monitoring program.

EPA notifies municipalities of move to alternate site during second half of '76.

NOAA initiates field studies of alternate areas for EIS.

EPA-ISC initiate "environmentally Acceptable Alternative" Study: \$500,000, 2 years.

EPA notifies COE of need for dredged material site change.

EPA-Raytheon Company initiate a three-cruise baseline study in northern alternate area: \$700,000, 2 years.

EPA initiates three (3) enforcement proceedings.

EPA requires industries to submit implementation plans or engineering reports for the complete phase out by 1981.

1975—EPA-Dames & Moore initiate preparation of EIS on sewage sludge dumping: \$200,000, 2 years.

EPA designates "Most Appropriate Marine Sensitive Organism(s)" for use in bioassay reports.

EPA includes virology studies in Bight monitoring program.

EPA-NOAA-ISC initiate expanded field studies of alternate areas for EIS: \$130,000, 1 year.

EPA initiates four (4) enforcement proceedings.

Eighteen (18) industrial and one (1) municipal waste generators are phased out.

1976—Ten (10) industrial and two (2) municipal permits/applications are denied or withdrawn.

EPA issues draft EIS on sewage sludge dumping in bight.

EPA-NASA initiate evaluation of new coliform methodology.

TABLE 2.—OCEAN DUMPERS PHASED OUT IN REGION II—1974-75

No.	Company	Volume (gallons per year)	Alternative method
JN 105.....	Bell Labs.....	245,000	Industrial waste handler.
NJ 096.....	Blue Ridge Winkler.....	1,800,000	Landfill.
NJ 011.....	Chevron.....	10,950,000	Industrial waste treatment.
NJ 079.....	Eagle Extrusion.....	96,000	Recycle.
NJ 100.....	Evor Phillips.....	25,000,000	Out of business.
NJ 080.....	Gaess Environmental.....	10,000,000	Landfill.
NJ 033.....	Hess.....	2,239,100	Ceased production.
NJ 072.....	Howmet.....	120,000	Recycle-landfill.
NJ 070.....	Mycalox.....	1,000,000	Industrial waste treatment.
NJ 085.....	Nestle.....	5,460,000	Landfill.
NJ 101.....	Riegal Products.....	520,000	Industrial waste treatment—landfill.
NJ 086.....	U.S. Radium.....	6,000,000	Incineration.
NJ 092.....	Schaefer Septic.....	10,400	Did not reapply.
NJ 064.....	Sherwin Williams.....	28,000	Industrial waste treatment.
NJ 083.....	Solvents Recovery.....	660,000	Landfill.
CO 45.....	Stamford, city of.....	1,000,000	Incineration.
NJ 084.....	Tenco.....	250,000	Recycle.
NJ 093.....	Warner Lambert.....	150,000	Landfill.
NJ 073.....	Worthington Blochem.....	9,300,000	Industrial waste treatment.



TABLE 3.—INDUSTRIAL OCEAN DUMPING PERMITS

No.	Applicant	Phase out date	Permitted volume (mg/yr)
NJ 004	Allied Chemical	1981	22.6
NJ 001	American Cyanamid-Linden	1979	40.0
NJ 106	American Cyanamid-Princeton	June 1976	.263
NJ 071	Arrow Group	March 1976	1.4
NJ 098	J. T. Baker	July 1977	1.4
NJ 077	Coca-Cola	May 1976	10.0
PA 110	Crompton & Knowles (Special)	February 1979	6.0
NJ 078	Curtiss-Wright	June 1976	.216
NJ 006	E. I. DuPont	1981	85.0
NJ 099	Fritzsche-D&O	November 1976	.3
NJ 066	International Wire	July 1977	.096
NJ 102	Keuffel & Esser	February 1977	.88
NJ 097	Leeming/Pacquin	July 1977	1.8
NJ 010	Merck & Co.	1981	7.2
NJ 076	M/M Mars	November 1976	.65
NY 023	Moran Towing Corp. (Special)		1 460
NJ 115	Nassau County	November 1976	.927
NJ 014	NL Industries	1981	675.0
NJ 081	Norda	June 1976	.9
NJ 082	S. B. Penick	July 1977	1.6
NJ 074	Reheis Chemical	July 1977	5.8
NJ 112	Rollins Environ	April 1976	7.2
NJ 065	Sobin Chemical	March 1977	2.0
NJ 109	S. B. Thomas	August 1976	1.1
NJ 063	Whippany Paper Board	January 1977	18.5

<sup>1</sup> K yd<sup>3</sup>.

TABLE 4.—PUERTO RICO OCEAN DUMPING PERMITS

No.	Applicant	Phase out date	Permitted volume (mg/yr)
PR 013	Abbott Chemicals	April 1978	0.1
PR 075	Brischem	do	1.44
PR 114	Cyanamid de Puerto Rico	do	5.0
PR 026	Merck Sharp & Dohme	do	27.4
PR 043	Puerto Rico Olefins	March 1977	16.8
PR 041	Oxochem Enterprise	April 1977	26.4
PR 024	Pfizer Pharmaceuticals	April 1978	6.0
PR 104	Schering Corp.	June 1977	14.6
PR 005	Upjohn Manufacturing Co.	April 1978	60.0

TABLE 5.—MUNICIPAL OCEAN DUMPING PERMITS

No.	Applicant	Permitted volume (mg/yr)
NJ 019	Bergen County Sewer Authority	59.5
NJ 103	Caldwell Trucking Co.	1 3.6
		1 7.0
NY 068	Glen Cove	3.0
NJ 022	Joint Meeting	32.5
NJ 021	Linden Roselle Sewerage Authority	48.7
NY 007	Long Beach	3.0
NJ 111	General Marine Transport Corp.	1 2.5
NJ 008	Middlesex County Sewerage Authority	85.6
NJ 002	Middletown Sewerage Authority	4.6
NJ 017	Modern Transport Co.	1 33.5
		1 20.0
NY 028	Nassau County	1 89.8
		1 .070
NY 009	New York City	764.0
NJ 003	Passaic Valley Sewerage Commission	136.0
NY 029	Westchester County	19.3
NY 031	West Long Beach Sewer District	.375

<sup>1</sup> Municipal.<sup>2</sup> Septic.

TABLE 6.—VOLUMES OF WASTE MATERIALS DUMPED IN REGION II

[In wet tons]

	1973	1974	1975
<b>Sewage sludge—New York Bight:</b>			
Bergen County Sewer Authority.....	231,000	242,000	278,000
Joint Meeting of Essex and Union Counties.....	129,000	125,000	116,000
Linden Roselle Sewerage Authority.....	67,000	142,000	142,000
Middlesex County Sewerage Authority.....	342,000	340,000	331,000
Middletown Sewerage Authority.....	10,000	11,000	20,000
Passaic Valley Sewerage Commissioners.....	555,000	517,000	570,000
City of Glen Cove.....	7,000	4,000	4,000
City of Long Beach.....	8,000	7,000	7,000
Nassau County.....	354,000	336,000	349,000
Westchester County.....	74,000	80,000	112,000
West Long Beach Sewer District.....	500	1,000	600
New York City <sup>1</sup> .....	2,540,000	2,050,000	2,040,000
Modern Transportation Co.....	224,000	309,000	212,000
General Marine Transport Corp.....	36,000	39,000	88,000
	4,577,500	4,203,000	4,269,600
<b>Acid wastes—New York Bight:</b>			
Allied Chemical.....	65,000	62,000	53,000
NL Industries.....	2,540,000	2,190,000	2,030,000
DuPont <sup>2</sup> .....	157,000	86,000	.....
	2,762,000	2,338,000	2,083,000
<b>Cellar dirt—New York Bight:</b>			
Moran Towing Corp.....	39,000	360,000	185,000
Water Tunnel Contractors.....	65,000	.....	.....
	<sup>3</sup> 455,000	<sup>3</sup> 360,000	<sup>3</sup> 185,000
<b>Chemical wastes—New York Bight:</b>			
DuPont <sup>2</sup> .....	127,000	170,000	290,000
Chevron.....	27,000	29,000	24,000
Hess Oil.....	8,000	.....	.....
American Cyanamid.....	130,000	151,000	128,000
Modern Transportation Co.....	37,000	39,000	86,000
	329,000	389,000	528,000
<b>Chemical wastes—Puerto Rico.....</b>	38,000	231,000	252,000

<sup>1</sup> Decrease in volumes during 1974-75 due to construction.<sup>2</sup> DuPont dumped at 2 sites in 1973-74.<sup>3</sup> Volumes in cubic yards.

TABLE 7.—REGION II ENFORCEMENT ACTIONS

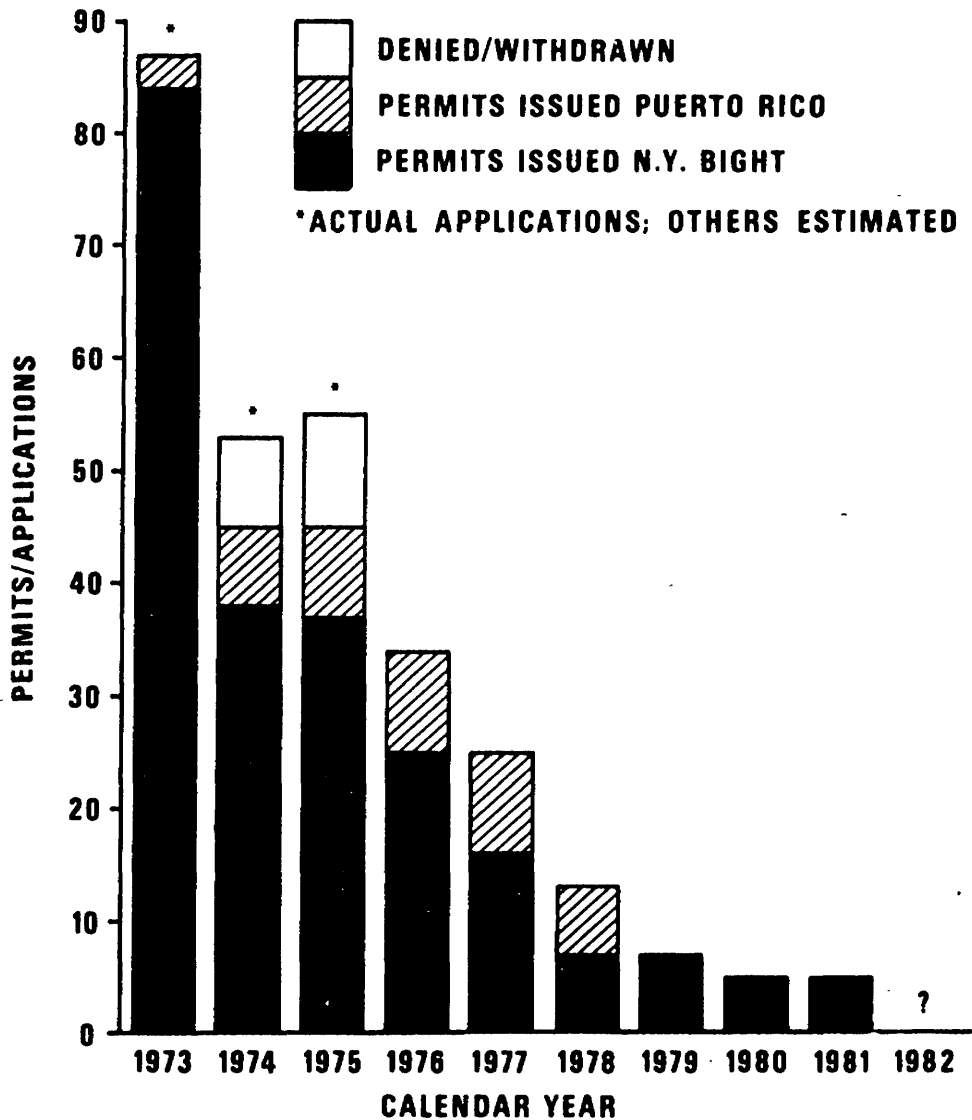
Order No.	Respondent's name	Referral from	Type of violation	Notice of violation	Disposition	Disposal site
73-1.....	General Marine Transport Corp.....	EPA	Permit condition. Dumping without a permit.	Nov. 21, 1973	Final order—May 15, 1974, hearing officer upheld General Marine on both counts.	Sewage sludge.
74-1.....	Moran Towing and Transport Co..	USCG	Dumped outside authorized dump site.....	Jan. 23, 1974	Final order—May 27, 1975, \$25,000 penalty payment. Appealed U.S. District Court.	Acid wastes.
74-2.....	Modern Transportation Co.....	USCG	.....do.....	Apr. 2, 1974	Final order—Jan. 22, 1975, charges withdrawn.	Sewage sludge.
74-3 and 74-5..	Pollution Control Inc.....	USCG	.....do.....	Apr. 16, 1974	Final order—Sept. 13, 1974, \$40,000 penalty and install additional equipment on towing vessel and barges.	Chemical wastes— Puerto Rico.
74-4.....	Spentonbush Transport Service, Inc.	USCG	.....do.....	June 6, 1975	Pending.....	Chemical wastes.
75-1.....	Clerical error <sup>1</sup>					
75-2.....	Modern Transportation Co.....	EPA	Higher concentration of several parameters than that reported in the permit application.	Mar. 5, 1975	Pending.....	Chemical wastes.
75-3.....	Chemical Recovery, EPL Ind.....	EPA	.....do.....	Mar. 5, 1975	.....do.....	Do.
75-4.....	Nassau County.....	EPA	Failed to segregate waste.....	May 6, 1975	Final order—June 16, 1975, no penalty; ordered to terminate dumping of industrial wastes.	Sewage sludge.
75-5.....	Moran Towing and Transport Co	NASA-EPA	Dumped outside authorized dump site.....	Aug. 14, 1975	Pending.....	Acid wastes.
75-6.....	Pfizer Pharmaceutical, Inc.....	EPA	Exceeded volume limit.....	Aug. 14, 1975	Final order—Aug. 28, 1975, \$5,000 penalty payment.	Chemical wastes— Puerto Rico.
75-7.....	PCI International, Inc.....	EPA	.....do.....	Aug. 14, 1975	Final order—Dec. 3, 1975, \$3,000 penalty payment.	Do.
75-8.....	Puerto Rico Olefins Co.....	EPA	.....do.....	Sept. 4, 1975	Final order—Sept. 19, 1975, \$4,000 penalty payment.	Do.
75-9.....	PCI and McAllister Bros.....	USCG	Dumped outside authorized dump site.....	Dec. 11, 1975	Pending.....	Do.

<sup>1</sup> No investigation necessary.

Mr. HANSLER. Thank you.  
May we have the first slide.

[Slide No. 1]

## OCEAN DUMPING - INDUSTRIAL PERMITS 1973-1981



SOURCE: EPA REGION II  
FEB. 1976

Mr. HANSLER. The EPA had some experience with ocean dumping before we got the Marine Protection, Research and Sanctuaries Act in 1972. There had been a dumping off the New York Bight for 44 years, and down the Caribbean off Puerto Rico.

In Puerto Rico, some new industries which had been promised regional waste treatment plants if they located in one area, did locate. However, the treatment plant was not available. They discharged their waste into a river. There was a local cry from citizens. Industry came to us and said, What can we do?

We analyzed it and said obviously it is not a good idea to put it in the river. The ocean is an alternative. However, we do not have authority to let you go into the ocean. At that time we did not have the authority to prevent them from going into the ocean.

From a regional level we did determine a sensitive marine organism for Puerto Rican waters. It was a sea urchin and we suggested they run bioassays. That is how ocean dumping began anew in this region before the act of 1972.

Since 1972 in this region we think we have gone a long way in implementing the intent of the MPRSA, the act. There are five general functional areas we utilized. [Slide No. 2.]

(1) Permit issuance.

# **REGION II OCEAN DUMPING PROGRAM**

**-PERMIT ISSUANCE**

**-DEVELOPMENT AND IMPLEMENTATION OF ALTERNATIVES**

**-COMPREHENSIVE MONITORING**

**-EVALUATION OF ENVIRONMENTAL IMPACTS ON THE MARINE ECOSYSTEM**

**-ENFORCEMENT**

(2) Development and implementation of alternatives to ocean dumping.

(3) Comprehensive monitoring so we can take some of the speculation and emotionalism out of statements by the press and others who actually have speculated as to what is happening and have not taken the time to go out and monitor and determine what is actually happening.

(4) We have evaluated environmental alternatives to ocean dumping and recommended changes to ocean dumping.

(5) We carried on an enforcement program in accordance with the act and the regulations.

What is the picture insofar as industrial wastes? I thought we might start with that first.

The slide on industrial wastes, please.

[Slide.]

Mr. MURPHY. Would you describe what industrial waste is?

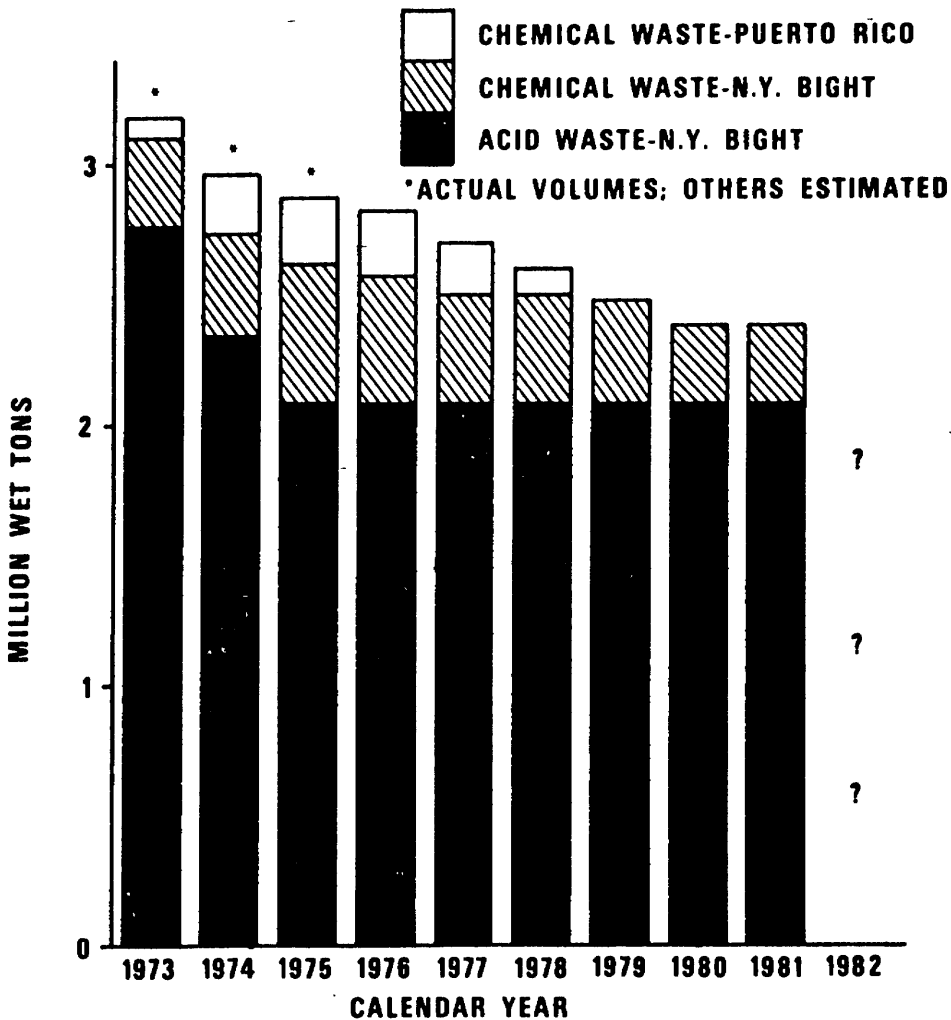
Mr. HANSLER. All right.

Industrial waste discharge is a sludge or a liquid material with contaminants that is disposed of in the ocean in lieu of being treated on the land—a land-based facility—or dumped into a manhole in some sewage system in Metropolitan New York, or the “midnight dump” as sometimes it’s called.

I would like the number of permits first.

[Slide No. 3]

## OCEAN DUMPING - CHEMICAL & ACID WASTES 1973-1981



SOURCE: EPA REGION II  
FEB. 1976

17

Mr. HANSLER. When we initiated the program in 1973 after interim regulations came out, there were over 80 industries dumping off the New York Bight. Within the past 3 years we have dropped to 24 industries. The remaining 24 are on schedule to phase out ocean dumping. The past three or four should be phased out by 1981.

I have a question mark above 1982 because the act says we are supposed to regulate ocean dumping and eliminate adverse impacts to the ocean environment.

EPA has developed 403 criteria in dealing with what can be tolerated if you practice ocean dumping. I believe that under the present law, if an industry can show that their discharge will not violate criteria, and there would be no adverse impact to the marine environment, that legally they could probably continue to ocean dump.



You might have instances where discharge of a waste in a lake or fresh-water stream would be a contaminant, such as sodium and calcium chloride.

However, the discharge of that into the ocean with proper dilution practices would not constitute a pollutant. I do not see how you are going to make the ocean more salty. I think over the long haul there will be some types of so-called industrial wastes which are innocuous and can be disposed of in the ocean.

However, we are pushing to phase out all ocean dumping by 1981.

We think we have gone a long way in 3 short years.

Mr. MURPHY. You are not just talking about industrial?

Mr. HANSLER. I am talking about industrial only at his point in time.

Mr. MURPHY. What is the shaded area?

Mr. HANSLER. The shaded area represents the ocean dumpers in Puerto Rico.

The dark are the areas off the New York Bight that show the permit applications which were denied or withdrawn.

We have not issued one new industrial ocean dumping permit off the New York Bight since the program began.

Mr. MURPHY. Why the increase in Puerto Rican permits?

Mr. HANSLER. The increase in Puerto Rican permits is because these chemical plants that were promised a regional treatment system if they constructed down there and they made their plans back in 1966, went on line, and there was no treatment plant into which they could connect.

Again, the ocean dumping of those wastes does meet our ocean dumping criteria.

Mr. MURPHY. Who was going to do the treatment plant in Puerto Rico?

Mr. HANSLER. The treatment plant would be constructed by the sole operator of municipal treatment plants, which is the Puerto Rico Aquatic and Sewer Authority.

Mr. MURPHY. The Commonwealth would do it?

Mr. HANSLER. The Commonwealth; yes.

We have had money available, 75 percent Federal funding.

Actually, they were impacted by successive laws. Under the old laws, there were oceanographic studies which showed that primary treatment of the municipal and some of the industrial waste would meet water quality standards, which was the old approach. When the new law was passed and the requirement of secondary treatment arose, higher levels were required and they have not moved ahead in proper fashion. We cannot wave our wand and build a treatment plant, whether it is for New York City or the Commonwealth of Puerto Rico. They must take some action in the first instance.

Can we look at the next slide, which deals with volumes?

Mr. HANSLER. The numbers of industrial permits have dropped substantially. The volume, the total volume, has not dropped substantially because of National Lead, Du Pont, American Cyanamid, and Allied Chemical.

Are those the four?

Mr. ANDERSON. Merck.

Mr. HANSLER. Merck.

Two of those dump at the acid waste site and have large volumes. There has been a considerable amount of background bioassay work done at the acid dump site. The net effect, the adverse environmental impact, has not been considered to be significant. However, we are still putting them on schedules in the interim permits to phase out by 1981.

The question marks over 1982 are there again because under the law, if an industry can show they are meeting the regulations and the 403 criteria, and they are not producing an adverse impact on the marine environment, they can continue to dump.

Mr. MURPHY. You realistically think that you are going to go from that level in 1981 to a zero level in 1982?

Mr. HANSLER. I do not think we will go to zero. I think probably a couple of those big dumpers will phase out. I think, as with big industry in general, they may show and contest it all the way through the Federal court system that they are meeting the law and they should not be prohibited from ocean dumping. That remains to be seen. It is speculation at this point in time.

Mr. MURPHY. Are those companies that you mentioned doing anything other than preparing legally to delay the 1981 requirement to meet with other dumping and alternative processes?

Mr. HANSLER. Yes. They are in the process of developing alternative processes. I would like Dr. Anderson to talk about the status of those processes with those companies.

Mr. ANDERSON. Du Pont, Merck, and Allied Chemical, and NL Industries, they are under orders under permit conditions in their ocean dumping permits to continue studying alternatives; and they just recently submitted, on February 20, an update of their plan to phase out by 1981.

I have reviewed two of them so far. Allied and Du Pont, both of them, are trying to approach their implementation plan by trying to meet the criteria as spelled out in regulations.

I have not had an opportunity to completely review Merck and NL Industries at the present time.

Mr. MURPHY. When you have completed that review, would you forward it to the committee for this record?

Mr. ANDERSON. I would be happy to.

Mr. HANSLER. Are there any more questions on the industrial aspect.

Mr. CORRADO. I have one question, Mr. Chairman.

Mr. Hansler, what happens to these wastes when the ocean dumping program is phased out. Where do they go?

How are they disposed of, assuming they cannot dump any longer?

Mr. HANSLER. If they have a land-based treatment facility you can incinerate the pesticide or other organic residues at a high temperature; and that will render them innocuous.

Basically, you will have going out the stack carbon, phosphorus, or perhaps some hydrochloric acid. We are talking about one environmentally sound land-based alternative—incineration.

EPA does not have authority over ground water contamination. That resides in the States of New York and New Jersey.

We are investigating a landfill disposal site in New Jersey at this point in time.

Was it Kim-Buc?

Mr. ANDERSON. Kim-Buc.

Mr. HANSLER. Kim-Buc.

Our investigation is to determine if toxic wastes are flowing in surface water from this New Jersey-approved toxic waste disposal site into the Raritan River.

We do not go behind a dumper's statement to find out what his alternative is, if he says that he is going into a State-approved toxic waste disposal site.

There were some 33 inspections made at the Kim-Buc site by the State of New Jersey within the past—what period?

Mr. ANDERSON. Six months to a year.

Mr. HANSLER. Six months, and there is a monitoring of that alternate site.

Mr. SPENSLEY. Mr. Chairman, I have a couple of questions about land-based alternatives, if you want to pursue those now, or perhaps later.

Mr. MURPHY. I think we better pursue them right now.

Mr. SPENSLEY. I had one question, Mr. Hansler. You might want to have one of your coworkers answer this.

The section on alternatives to the proposed action goes into some discussion of land-based alternatives. With the exception of one of those three or four alternatives, most of them seem to turn on the economics of an alternative disposal mechanism, as distinct from environmentally sound or technical problems.

Would that be your estimate of the alternatives as well?

Mr. HANSLER. I think when we are talking about alternatives, you are going to have each industry look at a range, and there is a range.

They will take the cheapest one that is environmentally acceptable. If they get to the point where the technology is there, but they may reduce their profit to a level where they have no profit or they have marginal profit or they have a loss, they may go to partial treatment and try to continue to ocean dump, but only if they meet the 403 criteria.

Again, I would go back to which alternative will they select. They will select the cheapest one that is environmentally acceptable and land based. If they get to the point where there is no economically feasible land-based alternative, then they will try to continue to ocean dump, but they only will be allowed to do this if they meet the regulations.

We do not make the decision as to which alternative they select.

Mr. SPENSLEY. I understand that. I just wanted to make sure that we agree that really we are talking about economics in terms of the difference between dumping in the ocean or dumping in some land area, except for perhaps an alternative that might be concerned with the technical ability to do land application disposal.

Mr. HANSLER. We are talking about environmentally acceptable alternatives. If it is going to be a treatment plant that discharges into a waterway, or where there are air emissions, we will look at

those alternatives. If it is going to be into a land fill or by containment, that winds up as a State responsibility at the present time.

But it is not purely economic. It is economic and also what are the alternative technologies for land-based disposal that are environmentally acceptable.

Mr. SPENSLEY. You are saying that there are no alternatives that are land based that are technically feasible?

Mr. HANSLER. Sure there are. Many of those permittees dumping in the ocean went to acceptable land-based alternatives.

Mr. SPENSLEY. In those cases it is just a question of economics?

Mr. HANSLER. No; it is not. We are forcing them from ocean dumping to an alternative. It is costing them more to treat the waste in an acceptable land-based facility than it was to ocean dump; but they are doing that because we have to get rid of ocean dumping.

You do not move from over 80 ocean dumpers down to 24 until you have a regulatory program. They are not phasing out because they are making money. It is costing them money to phase out.

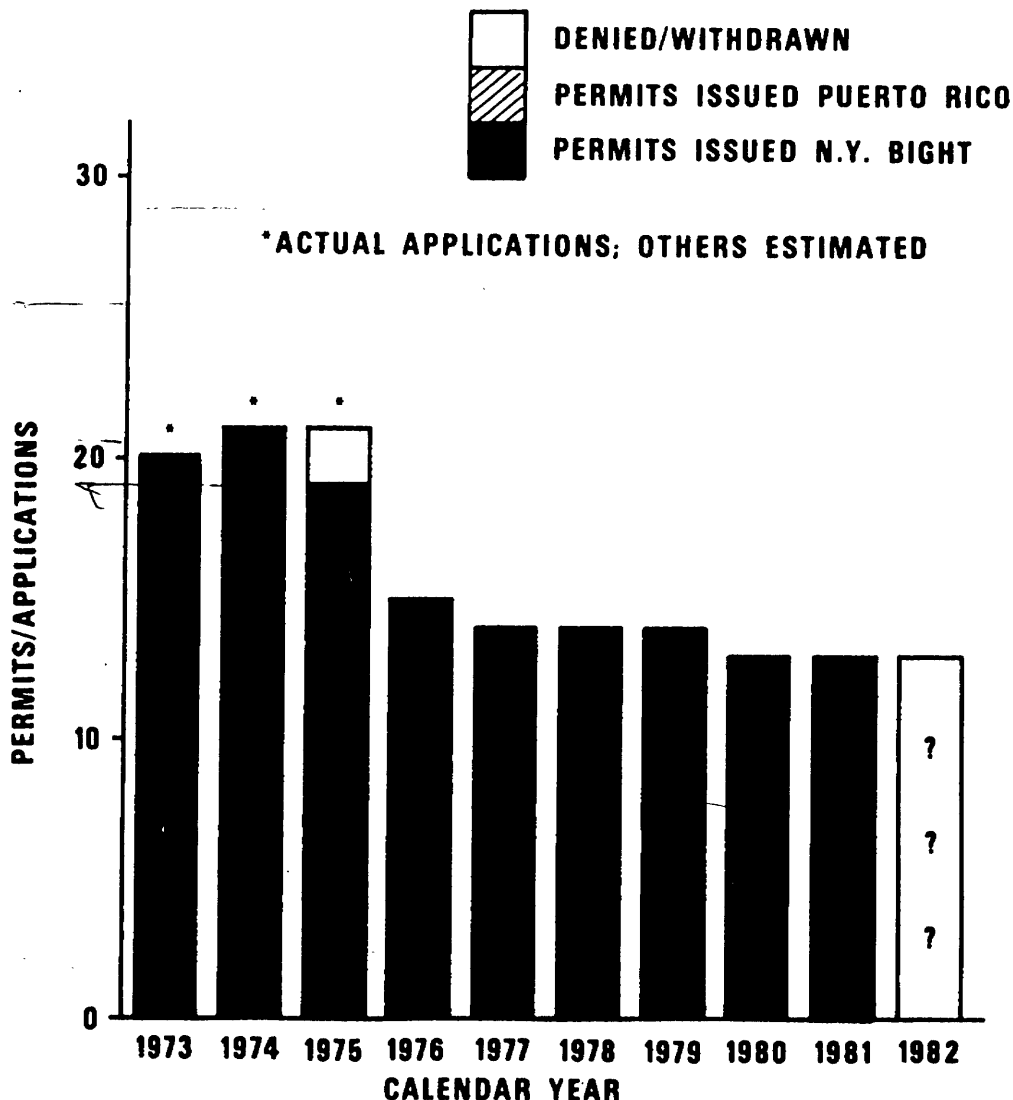
Mr. SPENSLEY. I am just trying to focus in and bring us to a point that we seem to be missing or not agreeing on.

Mr. Chairman. I will defer any more questions.

Mr. HANSLER. Municipal permits.

[Slide No. 4]

## OCEAN DUMPING - MUNICIPAL PERMITS 1973-1981



SOURCE: EPA REGION II  
FEB. 1976

NOTE: Permits issued to 11 NY City STP during  
1973-75 are graphed as a single permit.

7

Mr. HANSLER. The number of municipal permits has gone down because when you put on line a regional system, such as those on the coast of New Jersey or on Long Island, you get rid of many small applicants and you have one big applicant.

Again, we have the question marks in 1982. We have put all the municipalities on record that we want ocean dumping out of the New York Bight—phased out by 1981. That is the goal. The goal has

not changed. The question marks are there because if there is not a land-based alternative in place by 1981, in fact, there will still will be ocean dumping.

We have 21 million people in a 50-mile radius of Metropolitan New York. We do not have vast farmlands and forest lands to handle these wastes. Many of the treatment plants do not have the capability of vacuum drying, and piling up and composting that some other systems such as Blue Plains may have. We probably will not have alternatives until 1981. And, we will only have an alternative by 1981 if the municipalities and the sewerage authorities begin with their facility plans, their final plans and specifications, and promptly submit their grant applications in for step 1, step 2, step 3 grants under the Federal construction grants program.

Before EPA had the act, in 1971, we conditioned the construction grants we issued in Metropolitan New York so that the applicants must agree to join a regional approach to sludge management. We did not know if we have the authority to condition a grant in that regard; but, no one told us we did not have the authority and the grantees agreed to our condition.

To help implement that grant condition, we developed a sludge management committee for the States of New York, New Jersey, and the major sludge generators in this geographical area.

We have also given a grant to the Interstate Sanitation Commission to determine three things.

First, to survey the range of environmentally acceptable and economically feasible options to sludge dumping in the ocean. That was phase 1 of the ISC grant and they completed their report on time last June 30. The committee got a copy of their phase 1 report which did cover the range of alternatives.

Phase 2 and 3 dealt with putting some "flesh" on the "bones" of two different phases of the problem.

No. 1, what are the best alternatives from an environmental and an economic standpoint; and, No. 2, what kind of an institutional or operational agency arrangement should be recommended? Should we have one big sludge-treating monster in the New York metropolitan area? Should the Port Authority do this? Should the Corps of Engineers do this? Should the Interstate Sanitation Commission do this? Should we have one single agency on the Jersey side and one on the New York side?

Right now all this sludge is collected and it passes through the New York Harbor and is dumped at one place—the Bight.

The ISC and their contractor are in the process of completing these last two phases. The contractor, Camp, Dresser & McKee, will submit their report on time by June 30. The Interstate Sanitary Commission will report by the end of September of this year.

Right now it looks like pyrolysis is the route to go. There is some energy recovery and air pollution emissions from a pyrolysis unit are only one-quarter of the emissions from a modern sludge incinerator which meets EPA's new source performance standards under the Clean Air Act.

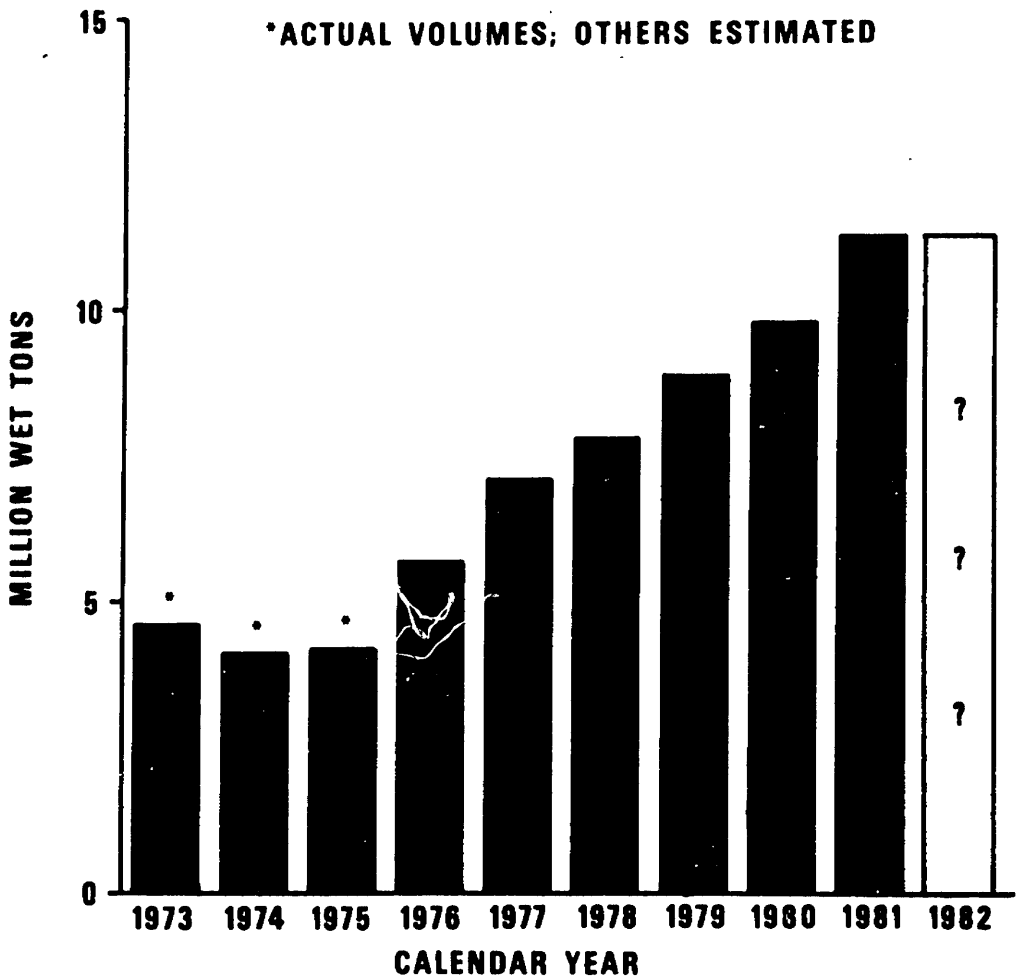
So, it looks as though from energy and air pollution standpoints, pyrolysis is the route to go.

In a preliminary fashion the ISC, New York State, New Jersey and some of the major sludge generators, such as New York City and Passaic Valley, all think there should not be one or two big pyrolysis units, but several in subregional areas. They think from a cost effective standpoint and a transfer standpoint this is the route to go.

Could we have the next slide?

[Slide No. 5]

## OCEAN DUMPING - MUNICIPAL SLUDGE 1973-1981



SOURCE: EPA REGION II  
FEB. 1976

Mr. HANSLER. The volumes of municipal sludge, they have gone down in 1974 and 1975 from 1973. This is probably because of two factors.

One, the economy has been down.

Actually the population in New York City has dropped and also New York City has had to bypass temporarily some of their sewage during construction phases.

When you convert one old primary treatment unit to a new primary unit or a secondary unit, you have the Port Richmond problem of temporary by-passing. The volume of sludge has not increased as we anticipated back in 1973 because of delays in the completion of secondary treatment plants.

The North River plant would not have been completed until 1979 to 1980, and now they are probably talking about 1980 to 1981, depending upon the financial capability of the city.

The Red Hook plant is not yet under construction.

You will get, as stated by Chairman Murphy, you will get a double to triple increase in the volume of sludge once the secondary plants go on line.

Are there any questions on the number of permittees or the volume of sludge?

Mr. MURPHY. Who is eligible for a permit?

Mr. HANSLER. Anyone that applies for a permit and meets our regulations is eligible for a permit.

Anyone that applies for a construction grant to build an alternate to sludge disposal in the ocean, we will fund if the project is certified to us by the State and it meets Federal grant requirements.

It is going to be very important for New York City and the New York State Legislature, for the major regional systems in New Jersey and their legislature, to provide the financial wherewithal to come up with the local 25-percent share to match the 75-percent Federal share to pay for an alternate to ocean dumping.

The estimated bill to construct facilities which would serve as an alternative is a half billion dollars. This means \$125 million from State or local government in this area and \$375 million from the Federal Government.

The EPA's contractor which is conducting the survey as to sewerage system needs around the country has been advised—they were advised this week—to take a fine pencil and a hard look and make sure that the alternate sludge disposal needs are woven into this 1976 "needs" survey.

Again, I cannot fund a project for an alternate sludge disposal unless the city and the State act in the first instance. And, I cannot put down this year in a permit that New York City must phase out ocean dumping by 1979 merely because Philadelphia has been asked to do this with half of their sludge by 1979. I would be making a hollow promise to the public. It would be an impossibility.

What we are trying to do is develop a plan to harness the technology, to get a handle on the technology, and to move the cities and States towards this 1981 date—not make hollow promises as to ocean dumping being phased out by 1978 or 1979. We have tried to be reasonable. But, phase out is not going to happen by 1981 unless necessary events occur in a timely fashion.



Mr. SPENSLEY. May I ask a question, Mr. Chairman?

Mr. MURPHY. Yes.

Mr. SPENSLEY. Mr. Hansler; you will probably find I am hung up on alternatives to ocean dumping. There has been some discussion we have had over region 2 activities, some discussion that perhaps region 2 is soft on ocean dumpers.

Would you agree with that?

Mr. HANSLER. No.

If you look at a record on the industrial side, we have gone a heck of a long way.

If you look at the issue of moving toward an improved sensitive marine organisms, we have factored in three in our permits this year. I think we have been out front in this respect.

Insofar as the municipal side, if you say putting out a 1981 date is going soft in the municipalities, I will differ with you because I do not want to condition in a permit something that is impossible. We have too many deadlines in these environmental control laws nationally, which promise impossibilities.

We are not going to have all municipal waste treated by 1977, as promised in Public Law 92-500. That was and is a physical impossibility.

Mr. SPENSLEY. How do you know this is an impossibility, Mr. Hansler?

You have on page 9 of your testimony at least a dozen or more companies that have found alternatives to ocean dumping.

Now, if these people find alternatives which apparently must be economically feasible, why do we have to set a 1981 date for others?

Mr. HANSLER. For others, there is a difference. One is industry and one is municipalities. The municipalities, with all the redtape and requirements, move much more slowly.

Mr. SPENSLEY. One last question, Mr. Chairman.

Would you agree with the actions that EPA took in Philadelphia?

Mr. HANSLER. Would I agree?

Mr. SPENSLEY. Yes.

Mr. HANSLER. If Philadelphia has an alternative, I would agree with that.

But, if Philadelphia does not have an alternative and they are going to wind up backing off that date of 1979 or going to court in trying to enforce something that is impossible, I do not think I would have put that date in in the first instance.

I do believe in deadlines. Our deadline is 1981. We are trying to move there as quickly as possible.

We did not have to give a grant to ISC to look at other alternatives. We did not have to condition sewerage grants in 1971 to say you must go to a sludge management practice that is not ocean dumping.

Mr. MURPHY. Philadelphia has no shoreline. They are upriver. So it is Maryland and New Jersey that get the benefit of the Philadelphia sludge.

Mr. HANSLER. That is right.

Mr. MURPHY. So why should Philadelphia move forward?

Mr. HANSLER. Well, I know if I was the mayor of Philadelphia, I would try to get the Pennsylvania Legislature to open up some of those abandoned mines up in Pennsylvania. They do have an alternative and it is very close.

Mr. MURPHY. They turned New York down on the mines.

Mr. HANSLER. I know they turned New York down.

Now, Philadelphia wants to dump their garbage above the aquifer in South Jersey.

Mr. SPENSLEY. Mr. Hansler, are you convinced by the studies that have been done in your office or otherwise that it is impossible to meet some of these schedules?

I mean, you feel fairly certain in your testimony today that it is an impossible situation; yet all of the evidence I have seen, including the draft environmental impact statement, does nothing but raise questions of whether it is impossible.

Mr. HANSLER. You're right. Things are not impossible. It is not impossible to be there by 1981. It is impossible to be there by 1979 insofar as the municipal sludge from Metropolitan New York.

As far as the industries, it is very possible to be there by 1981. Believe me, we will pursue as hard with the last 4 as we have with the first 68 which we have eliminated from ocean dumping.

Yes; there are alternatives insofar as the municipal aspects. We are pushing as fast as we can on the administrative side because without that we are not going to have the facilities actually in place by 1981.

Mr. MURPHY. I think it is going to take a magic wand to go from that level down to zero from 1981 to 1982.

Mr. HANSLER. Well, I think we are not going to have the volume of sludge by 1981 that we were earlier predicting, because the North River plant may not be completed by that point in time.

The Red Hook plant is not under way as yet. It will not be completed by 1981.

We can well have the volume of sludge disposal land-based in 1981 that can handle the sludge generated at that point in time.

Now, I would like to go back to some statements in response to your opening remarks, Chairman Murphy, on the validity of the EPA, NOAA and Health data as to water quality impacts from the present dump site.

Back in 1973 there was a professor from Brooklyn.

Mr. MURPHY. Before you discuss that dump site, I just wanted to show this, which is a core taken from that dump site about 2½ miles north of the present site. It is clear that you have at least 14 inches of the bottom impeded, but it would require a scientific cross section to determine results. I want to thank NOAA for making that core and making it available for us today.

Mr. HANSLER. NOAA will explain that.

Is the sludge site moving?

We did not know until we went out with NOAA and analyzed it from a factual standpoint; and the experts say, "No, it is not moving." The experts also say that the sludge blanket that has been built up there for the past 44 years is from 6 to 14 inches thick,

increases by 2 centimeters a year, and is 20 square miles in diameter.

But as to a hazard on the beach insofar as adverse impact on health we have sampled, NOAA has sampled, Raytheon has sampled, Nassau and Suffolk County Health Departments have sampled, and they cannot find it.

Mr. MURPHY. What about the shellfish restrictions?

Mr. HANSLER. The shellfish restrictions are there. They are going to be there.

We have raw sewage coming from New York City and improperly treated sewage from northern New Jersey. Even if we have secondary treatment plants on line, you are still going to have the raw sewage until you solve the combined sewer overflow problem. Just with normal urban runoff you are going to have shellfish beds which must be closed, even if every town has a secondary treatment plant.

There were studies done by the PHS down in the gulf, at Gulfport, Miss. Gulfport first had a primary treatment plant. The shellfish bed was closed. They went to a secondary plant with disinfection. The shellfish bed was open. Then they sampled after they had a 1-inch rain and they had to open and close the shellfish beds because normal urban runoff caused the violation of bacterial standards in the shellfish areas. I think if people believe that you are going to have open shellfishing in the Jamaica Bay and Raritan Bay, even when we phase out ocean dumping, even when we build the secondary treatment plants, you are kidding yourself because of the urban runoff problem.

Mr. MURPHY. In the document prepared by our staffs—and these are scientists making the charges—it says in regard to the second issue before the subcommittees:

Substantial criticism has been leveled at the manner in which EPA, NOAA, and the corps have utilized the resources available to them. The criteria used to evaluate permit applications has been challenged as incomplete and unnecessarily permissive. The research program undertaken by NOAA and EPA has been criticized for focusing too much on determining the impact of ocean dumping and not enough on the development of alternatives.

Finally, the wisdom of EPA's regional distribution of its limited staff has been questioned.

For example, in fiscal 1975, EPA's region II office processed 75 permits. The region III office processed six. Yet, EPA assigned only seven dumping personnel to region II, while assigning six to region III.

These are scientific charges we have received.

Mr. HANSLER. Okay.

I cannot rebut anything in that statement based on resources or what the corps and NOAA and EPA have done.

You asked how many resources we devote to this program. This last year we devoted 18. We were allocated six or seven positions. We had to beg and borrow because it is a big problem, and in this EPA region we recognize it as a priority problem.

If the agency receives \$1.3 million to run the program and we really need \$5 million, I cannot control that.

In region II, we used State 106 grant dollars to fund the ISC sludge grant. Section 106 of Public Law 92-500 is the State water pollution control program grant for the regulatory agencies. From New York and New Jersey, with their concurrence, we gave this contract to ISC to come up with alternatives because we did not have another financial mechanism.

Mr. MURPHY. I made it clear that it was not EPA's decision. You made the request of up to \$4.8 million and OMB has traditionally cut this down to minimum requirements.

Mr. HANSLER. We also gave money to ISC so they could subcontract to NOAA, so NOAA could do some of the work because NOAA did not get enough MESA funds.

I did read the report of GAO on their audit of the ocean dumping program. It was stated by the Coast Guard they have not had sufficient resources to monitor the ocean dumping practices. That is the Coast Guard function.

Mr. MURPHY. They did not ask for more when their authorization was up before the committee this week.

Mr. HANSLER. I am just stating that probably there has not been enough resources in this area for the program; but we have used everything we have had plus begged, borrowed, and stolen from other sources to try to do this job.

On the enforcement aspect, the Coast Guard referred 134 cases to us.

Mr. SPENSLEY. Excuse me. I want to ask one question about that, about the resources.

Has region II ever used EPA's laboratories at Naragansett or Gulf Breeze?

Mr. ANDERSON. We used the Gulf Breeze lab and the Naragansett lab.

Mr. SPENSLEY. On a regular basis?

Mr. ANDERSON. Yes.

We regularly invite O.R. & D. to help us out in our technical evaluations, specifically in the area of bioassays, what procedures, what test organisms, how to go about it. We came back with the questions from commercial labs who do the testing, again referring them back to the test developers at Naragansett and Gulf Breeze.

Mr. SPENSLEY. Do you feel you are using that to the greatest capacity in terms of your needs for resources?

Mr. ANDERSON. We attempt to; yes.

We also used Cincinnati and the industrial waste labs.

Mr. HANSLER. It has been an evolutionary process. It has been a two-way street. They say, "What test do you have there?" Then Naragansett or Gulf Breeze will try to validate our preliminary test procedures. It has not been easy in this approved marine organism development business. We have three right now that we think are qualified as sensitive organisms. The one that is most sensitive to the waste being discharged, we intend to make that the test. We think that is the proper approach.

On the referrals and the enforcement, the Coast Guard did refer 134 cases to us. Most of those by far were failure to notify the Coast Guard that the barge was leaving dockside.

We did not issue an order in those cases. We sent a warning letter. By using the warning-letter approach on this, there were no failures to notify the Coast Guard during 1975. So we think that procedure was effective.

We have levied fines of over \$40,000 for short dumping.

Mr. MURPHY. How many short dumping instances did you detect?

Mr. HANSLER. I do not think that EPA detected any. It is usually the Coast Guard or the Corps if they happen to be out there. It is included in our statement.

Mr. MURPHY. There is pollution around the city at night. Those incinerators get turned on and everything happens at night.

When those barges go out at night they start dumping from the time they leave the dock, so that their turnaround time is all cut shorter. This fact is supported by the scientists who gave you instances of 28 violations of short dumping causing a constant problem of short dumping, and no surveillance at the biggest dump site in the United States by the appropriate authorities.

Mr. HANSLER. Is the Coast Guard going to testify today?

Mr. MURPHY. We had them in Washington.

Mr. HANSLER. OK. We would like more surveillance. We do not like people to cheat. We do not want the New York Bight to be further messed up. But that aspect is not our program. We think we need more Coast Guard surveillance.

Mr. MURPHY. On the pyrolysis method that you brought out on page 14, you said that that system could not be on line until 1985.

What is going to happen between 1981 and 1985?

Mr. HANSLER. OK. We had a session with ISC—Interstate Sanitation Commission—and their contractor yesterday, and they think now that some pyrolysis units can be on line by 1981. We are talking about a multiple hearth furnace. They believe now that the technology probably is available.

We are trying to get a research grant underway to use a pyrolysis multiple hearth unit in Belle Mead, N.J., to test representative sludges from the New York metropolitan area. We think we will have data on the efficacy of using this approach within 4 months from the time the grant is given.

We are shooting to award that grant by April 1 of this year. We are looking very hard for acceptable alternatives, and we think that time frame can be cut down.

On figure 4 of our draft environmental impact statement it shows the sources of materials off the New York Bight, suspended solids, page 61, suspended solids, organic carbon, phosphorus, nitrogen, and lead.

We would probably be remiss if we did not mention the volumes of dredge material which add to this problem off the New York Bight, and that matter must be addressed if we continue to ocean dump.

Are you looking for upland disposal?

There is not much upland in the area.

Do you want to press for the Hofburn-Swimburn dredge spoil approach?

Again, we can take out the municipal sludge. We can take out the industrial waste, but if we still have settled sewage from the bottom

of the harbor from combined overflows, which is dredged from the harbor, moved a few miles out and redeposited have we really solved the problem?

Mr. MURPHY. Of course, this port would be an 18-foot port if we did not do maintenance dredging.

Mr. HANSLER. We have to maintenance dredge.

Mr. MURPHY. It is an absolute necessity to keep at least 35 to 40 feet in the port for its economic viability. Without going in for major landfill operations I see no alternative to the ocean dumping of dredged material.

Mr. SPENSLEY. Mr. Chairman, may I ask one question?

Mr. MURPHY. Yes.

Mr. SPENSLEY. Mr. Hansler, does region II staff actually review corps requests to dump sludge into the ocean?

Mr. ANDERSON. I do not; but they do in the EPA New York office. There is a staff under the water program that reviews all public notices out of the corps on dredge material.

Mr. SPENSLEY. Do you know what they are for?

Mr. ANDERSON. Generally, the characteristics of the dredge material and the criteria metals are submitted for review.

Mr. SPENSLEY. Has region II ever suggested or asked the corps not to dump dredge materials?

Mr. ANDERSON. I know of only one case, but I do not know the entire story. I would be happy to provide this if you so desire.

Mr. SPENSLEY. Well, does region II regard sludge dumping as a given—

Mr. HANSLER. Sludge or dredge spoil?

Mr. SPENSLEY. Dredge spoil. I am sorry.

Mr. HANSLER. I do not personally.

I have supported the Hofburn-Swimburn Island approach.

You have appropriated funds, I think, through your public works program for the modeling down at Vicksburg. Colonel Hunter will elaborate on that. It is an alternative. It is going to cost money.

Mr. SPENSLEY. The fact is you do not get much involvement in the corps' decision in terms of dumping policies.

Mr. HANSLER. We do for the dredge spoil that they have with contractors in Long Island Sound. Off the New York Bight it has basically been given because there has not been an alternative. Again, they dump in one single spot; but we have to keep the harbor open.

Mr. SPENSLEY. Thank you, Mr. Chairman.

Mr. MURPHY. On page 22 you state that an alternate dump site should be designated in the northern area for potential future use.

By "northern area," we are talking about the recommended area.

Did not NOAA recommend the southern area rather than the northern area because of the potential harm to the Hudson Canyon and the marine organisms which were found there?

The question is: Why did EPA choose the northern site and what were the factors that led to that choice rather than the southern site?

Mr. HANSLER. Dan?

Mr. SULLIVAN. There were basically three factors involved.

NOAA's decision in regards to the Hudson Valley Shelf was based upon a transport of sludge solids to that valley. The valley is

an area of sensitive marine organisms and, therefore, is a critical area.

We felt that the northern sludge location, which is essentially 30 nautical miles from the valley, was sufficiently distant to avoid any type of significant transport to the valley. The other two factors were basically economically related to existing shellfish harvesting areas in the vicinity of the southern area and the potential development of mineral resources; that is, oil and gas and potentially sand and gravel mining in and near the southern area.

The Food and Drug position relative to an alternate dump-site was essentially an immediate closure of an area surrounding the dumpsite within a radius of 6 nautical miles. We saw this as a definite economic impact on existing commercial harvesting of shellfish.

Mr. MURPHY. It would be tough on flounder, too.

Mr. SULLIVAN. Flounder, too; but the flounder are much more migratory. In other words, they are not as seriously impacted because of their mobility.

The clams, which essentially in their adult life are stationary, cannot move that much and would be more directly affected because essentially they cannot move.

Mr. SPENSLEY. You are with EPA, Mr. Sullivan; is that right?

Mr. SULLIVAN. Yes, sir.

Mr. MURPHY. The Chair is going to take a 5-minute recess.

[Short recess.]

Mr. MURPHY. The subcommittee will come to order.

Mr. Hansler, we have other questions which we are giving you to submit responses to the committee in writing. We appreciate your effective and expert testimony.

Mr. HANSLER. Thank you.

[The following was received:]

BRIEF RESPONSES TO INTERROGATORIES FROM HOUSE SUB-COMMITTEE ON  
OCEANOGRAPHY

*Question 1.* With respect to the ocean dumping hearings conducted in Puerto Rico last July is it true that Region II personnel made no direct presentation, that the public in attendance spoke Spanish, and that there was no interpreter? (a) Indeed, is it not Region II practice to allow the Puerto Rico hearings to be conducted with no interpreter present? (b) Why is it that Region II staff refrain from asking the industrial dumpers in Puerto Rico what steps they are taking to find alternatives to ocean disposal?

Answer. At the July 22, 1975 hearing on ocean dumping permit for Arecibo, Puerto Rico, the Regional hearing official, Mr. Paul Bermingham, made the following statement in his introductory remarks:

"On my right is Raqueline Ruiz de Montalvo from our office here in San Juan who is going to assist in the event of any language barrier problems."

Later, on page 23 of the hearing record, Mr. Bermingham made the following statement:

"For myself and my colleagues from New York, I do want to apologize for our inability to speak and understand Spanish. I want to assure you, however, that the transcript of the proceeding, when it is completed, will be translated into English and the English translation will be given careful consideration by us including all of the comments which have been made this evening in making our recommendations about these permit applications."

The record will show that EPA staff presented testimony at this hearing and responded to most questions.

Each applicant for an ocean dumping permit, whether municipal or industrial, is required to submit as part of his application a description of

steps that they are taking to evaluate alternatives to ocean dumping; or if they are already on a schedule to implement land-based alternatives, they are required to submit quarterly progress reports on compliance with that schedule.

**Question 2.** Has Region II ever attempted to analyze the Puerto Rican pharmaceutical company wastes for any parameter other than acute toxicity? For example, has anyone questioned the danger of dumping large quantities of antibiotics, synthetic microbes, and unusual bacterial species?

**Answer.** The pharmaceutical wastes generated by ocean dumping permittees, such as Upjohn, have not been tested for any parameters other than acute bioassay (*Tripneustes esculentus*) and for the chemical and physical parameters listed in the ocean dumping regulations "Sections 227.2 and 227.3".

The organism listed above was recommended by EPA-ORD (Office of Research & Development) for use in determining limiting permissible concentration as described in Sec. 227.7. ORD in recommending the use of this organism has made a scientific judgment that essentially states that using this organism, performing bioassay test under standard conditions, and in interpreting the results according to the ocean dumping criteria, will provide adequate protection to the marine environment from dumping operations.

**Question 3.** With respect to the ocean dumping hearings conducted in New York City, is it true that the Region II staff never attempt to question the industrial or municipal dumpers with respect to their efforts to find alternatives? (a) Is it true that 39 major industrial permits were issued last year following a hearing which lasted one-half hour? (b) Is it true that persons who hold interim ocean dumping permits are able from time to time to increase the quantities allowed to be dumped without going through any formal procedures; that often the allowed increases are accomplished through phone calls and other personal contacts?

**Answer.** A public hearing was held by Region II on June 12, 1975 in New York City to receive comments on the tentative determination on the part of the Region to issue ocean dumping permits to 25 applicants, primarily industrial waste generators. It is true that this public hearing lasted less than one hour. The Region staff discussed at this hearing the permit condition under each individual permit which pertained to the schedule for implementation of a land-based alternative. An implementation schedule is included as "Special Condition No. 7" on each and every permit issued for use of the acid waste and chemical waste dump site. The schedule is based on detailed engineering studies presented by the applicant as a condition of an earlier permit.

The public was given every opportunity through published notice of the scheduling of this hearing; however, only two oral statements were received, other than EPA staff—one by the Coast Guard and the other by DuPont. Written statements, however, were received from the Sierra Club of New York and the American Littoral Society concerning an application by the American Cyanamid Corp.

On occasion an applicant, because of increased production, has requested and justified in writing a need for increased volume during the term of a permit. Under no conditions has the Region allowed a modification based solely upon a phone conversation or other personal contact.

**Question 4.** It has been alleged that other EPA Regions hold public hearings at which extensive information is presented by both the applicant and the EPA staff, such as the condition of the dump site, recent monitoring cruises, research efforts into alternatives, bioassay results, etc., while Region II does none of this? Is this, in fact, true?

**Answer.** A review of the public hearing records will indicate that the Region has presented information on dump site conditions, research into alternatives, monitoring and surveillance activities, and pertinent information regarding the characteristics of the waste generated by the applicant. In addition, the Region's ocean dumping files are open to the public for inspection. This "freedom of information" is contained in all recent public notices on ocean dumping applications.

**Question 5.** Is it not true that Region II, unlike other EPA Regions, takes continued ocean dumping as a "given" and merely hopes to keep track of who is dumping and where?

**Answer.** A review of the Region record, since taking over the ocean dumping program in April 1973, will indicate a maximum effort to phase out ocean



dumping. For example, approximately 150 industries were ocean dumping under the COE program. During the June 1975 hearing we announced to the public that the number of industrial dumpers had been reduced to twenty-five. With regard to municipal dumpers, we admit that our phase out program has not been as significant; however, all municipal permittees are under an implementation schedule to phase out by 1981.

**Question 6.** Does Region II agree with the conclusion of NOAA MESA Report of March 1975, p. 7, reprinted Joint Hearings April 1974, p. 54) that EPA Region II allowed more waste solids to be dumped from the New York area alone than was discharged by all rivers from the U.S. Canadian border to the Chesapeake Bay?

**Answer.** We have no reason to doubt the conclusions of NOAA in the MESA Report dated March 1975. We assume that the waste solids that NOAA refers to include not only sewage sludge but dredge materials as well.

**Question 7.** Does Region II agree that if present regulatory practices continue, the quantities of solids discharged into N.Y. Bight will markedly increase in the years to come?

**Answer.** As indicated in our testimony on March 5, 1976, we fully expect that the upgrading of municipal treatment plants in the New York-New Jersey Metropolitan area will result in the generation of additional sewage sludges, and that an environmentally acceptable land-base alternative for the disposal of this material will take at least until 1981 to implement.

**Question 8.** With respect to the disposal of polluted dredge spoil in the Bight, is it true that Region II exercises no supervision or review of such disposal? (a) Does Region II staff actually review Corps' requests to dump dredge spoil into the ocean? (b) Has Region II ever suggested or asked that dredge spoil not be dumped into the ocean? (c) In inner harbor dredge spoils, are not the metal levels above acute toxicity levels for most marine organisms even after allowance for mixing? What are some of the metal levels in the Corps-dumped sludge?

**Answer.** All public notices issued by the New York District COE are carefully reviewed. Our comments are then forwarded to the COE, without which the COE will not issue a permit.

We prefer suitable upland disposal of polluted dredged material. However, when this alternative is not available, as frequently is the case in the New York Metropolitan area, we prefer that the dredged material be disposed of at the dredged material dump site as opposed to disposal in the more vulnerable estuarine areas.

In instances where the analytical testing has indicated a clean material with a high percentage of sand, which has occurred in maintenance dredging in the lower New York Harbor and Raritan Bay, we have recommended that the material be used for beach replenishment rather than be disposed of at the dump site.

The following are the maximum concentrations of heavy metals recently reported by the Corps ("shaker test results") :

Mercury—.08 mg/l

Cadmium—.12 mg/l

Arsenic—.06 mg/l

Lead—.90 mg/l

Copper—.20 mg/l

Zinc—.20 mg/l

Chromium—.20 mg/l

Nickel—.30 mg/l

**Question 9.** Does Region II avail itself of the resources of EPA's marine laboratories in Narragansett, RI and Gulf Breeze, Fla.? (a) Can you give some examples? (b) Aren't these labs far more equipped to do sophisticated environmental analyses than the Edison lab? (c) Has Region II ever informed members of these labs not to enter Region II jurisdiction?

**Answer.** The Region has on a number of occasions requested the assistance of EPA-ORD in evaluating permit applications, data submitted by applicants, data submitted by applicants, development of chemical, physical and biological methodology, development of alternative treatment methods, and evaluation of impact of dumping in the marine environment. Within the last year EPA-ORD was requested to assist us in (1) developing bioassay methodology for use with appropriate mature sensitive organisms; (2) review of an application by

FMC-US Air Force for the ocean disposal of a waste generated in the production of a rocket fuel; (3) review of an application by Con Edison for the disposal of boiler clean-out waste; (4) review of the initial draft "Sludge Dumping" EIS prepared by our consultant, Dames & Moore; (5) evaluation of technical information presented by DuPont concerning the interpretation of bioassay data for determining limiting permissible concentration; (6) collection and evaluation of satellite remote sensing data; and (7) assistance in developing alternate industrial waste-treatment techniques for a waste containing a known carcinogen. Representatives from Gulf Breeze and Narragansett were called upon by ORD Headquarters to provide assistance where their technical expertise was appropo.

EPA-ORD labs are generally equipped with sophisticated and specialized analytical equipment. Depending upon the required analytical determination, they may or may not be better equipped than the Region's laboratory in Edison.

There had been a few occasions when a member of APA-ORD staff has indicated on his own a willingness to assist the Region; however, such assistance was deemed unnecessary.

**Question 10.** Doesn't Region II believe that it can follow an ocean dumping policy that is at odds with the policy of other Regions and headquarters? (a) Has not Region II publicly stated that it will not follow the precedents handed down by Mr. Train in the DuPont and Philadelphia decisions? (b) Has Region II ever inquired of the EPA Office of Research and Development as to what research it is conducting into alternative methods to dispose of sewage sludge? Is Region II aware of such research conducted by or funded by EPA's Cincinnati lab?

**Answer.** The Region carefully coordinates all of its decisions regarding ocean dumping with headquarters. Mr. Train is fully informed of our decisions prior to public release. We know of no public statement in which the Region was at odds with Mr. Train.

The Region has been in continual contact with "sludge disposal experts" in EPA's Cincinnati Municipal Environmental (MERL) and Solid and Hazardous Waste Research (SHWRL) laboratories relative to alternative processes for sludge disposal.

**Question 11.** Is it true that almost all the industrial dumpers which Region II has phased out of the ocean are using a single landfill in New Jersey, and that the landfill poses a major health hazard?

**Question 11 (a).** Does Region II consider the disposal of large quantities of industrial wastes at this landfill to be a sensible alternative to ocean disposal?

**Question 11 (b).** Has Region II ever requested assistance of technical experts in Headquarters to determine whether in-process or recycling alternatives can be implemented in lieu of ocean disposal?

**Question 11 (c).** Is it not true that Region III has forced DuPont to use recycling methods which the company now operates at a profit?

**Answer.** A number of former industrial ocean dumpers have either on their own or as a permit condition implemented the alternative of landfill. Many of these previous dumpers are, in fact, going to a licensed landfill operation located in New Jersey. The Region, as well as Headquarters, interprets a legal landfill operation to be an acceptable alternative disposal method.

As indicated in questions 9 and 10 above, the Region has requested and received EPA-ORD assistance on a number of occasions concerning in-process or recycling alternatives.

Based on recent discussions with DuPont (Region III), we were informed that roughly 35,000 tons of a total of 142,000 tons were recycled (estimated U.S. market of 300,000 tons). The iron chloride solution is presently retailed for use in sewage treatment. However, DuPont is currently experimenting with the use of this material in water treatment. There is a slight profit when the material is sold within a 100-200-mile area from the plant. The freight becomes too costly at greater distances. DuPont must prepare the waste prior to retail. The cost of this preparation is greater than barging. It should be pointed out that there are no wastes of this type dumped in Region II.

**Question 12.** Do you believe that more money should be spent on research addressed to finding alternatives and less in dump site monitoring?

**Question 12(a).** Cannot we all accept that environmental damage is occurring at the dredge spoil, sewage sludge, acid dump sites?

**Question 12(b).** With the present state of the art, is it not impossible to draw reliable conclusions from studies of large ocean areas?

**Question 12(c).** Isn't there a dearth of serious effort to find alternatives to present disposal practices?

**Answer.** Yes, more EPA-ORD money should be spent on research addressed to finding environmentally acceptable alternatives to ocean disposal. According to recent reports, EPA-ORD presently are funding about 24 projects relating to the ultimate disposal of sewage sludge. Sixteen of these are for land application, six for incineration and two for pyrolysis projects.

Environmental damage is occurring at and near the existing sewage sludge dump site. However, in comparison to other pollutant loadings and the lack of significant recovery anticipated if the site were abandoned, we do not feel that the damage is significant. Since they have not been studied in detail, similar conclusions relative to the dredged material and acid wastes dump sites cannot be made.

The major advantage of studying of large ocean areas is that it allows a comparative evaluation of subareas (sites) within those areas. This approach was used to select an alternate sewage sludge dump site in the New York Bight; the selected site is the most favorable location in the areas studied.

EPA-Region II considers the proper disposal of sewage sludge to be a very serious problem. Our efforts to find alternatives to ocean dumping are sincere; it is our stated intention to phase out ocean dumping by 1981.

BRIEF RESPONSES TO INTERROGATORIES REGARDING TESTIMONY BY G. M.  
HANSLER, P. E., ON MARCH 5, 1976

**Question 1.** On page 4 you mention the "promulgation of interim permits." Is an interim permit one that is issued for materials that do not meet EPA's standard of what is safe to be dumped? (If so, then that means that certain materials are being dumped which are harmful to the marine environment, is that correct?)

**Answer.** Under Part 220.3(d) of EPA's Ocean Disposal Regulations, it is stated that under certain conditions the Administrator can grant an interim permit to dump; (1) materials listed in Part 227.31 (materials requiring special care) in excess of the limiting permissible concentrations (LPC) or (2) when the constituents identified in Part 227.22 (prohibited materials) are present as trace contaminants.

The Region with few exceptions has only issued interim permits since appropriate marine sensitive organisms, upon which LPC is calculated, for the N.Y. Bight were not designated until May 1975. Bioassay data are not available and if the applicants are willing to meet the LPC, they would be eligible for a special permit, assuming they meet all other requirements.

**Question 2.** Could you elaborate on the type of physical, chemical, and biological data which you say on page 6 that the dumpers must submit monthly? Is there any control by EPA of the samples they provide? Does EPA check the integrity of the samples on their own?

**Answer.** Industrial dumpers are required to submit analysis on a representative sample for the following parameters:

Bioassay (mg/l) using the organisms *Artemia salina*, *Skeletonema costatum*, *Acartia tonsa* or *Acartia clausii*, *Menidia menidia*, and/or any substitute organism designated to be more appropriate by EPA, Region II.

Mercury (mg/kg), liquid and solid phase.

Cadmium (mg/kg), liquid and solid phase.

Specific gravity at 20°C.

Oil and grease (mg/l), using liquid-liquid extraction with trichlorotrifluoroethane.

Petroleum hydrocarbon (mg/l), using tentative IR procedure pH:

Arsenic (ug/l)

Copper (ug/l)

Chromium (ug/l)

Lead (ug/l)

Zinc (ug/l)

Nickel (ug/l)

TOC (mg/l)

- Total solids (mg/l)
- TKN (mg/l)
- Total phosphorus
- Total alkalinity (mg/l as  $\text{CaCO}_3$ )
- COD (mg/l)
- Suspended solids (mg/l)
- Nitrate nitrogen (mg/l)
- Phenols (ug/l)

Additional analyses are required of some permittees for specific parameters associated with their individual wastes.

Similarly, analyses are required of municipal dumpers for the following parameters:

- Bioassay using the organism *Artemia salina* and/or any substitute organism designated to be more appropriate by EPA, Region II.

- Mercury (mg/kg), liquid and solid phase.

- Cadmium (mk/kg), liquid and solid phase.

- Specific gravity at 20°C.

- Oil and grease (mg/l), using liquid-liquid extraction with trichlorotrifluorethane.

- Petroleum hydrocarbon (mg/l) using tentative IR procedure.

- Fecal coliform (MPN/100 ml).

- Total coliform (MPN/100 ml).

- Bioassay using the organisms *Skeletonema costatum*, *Acartia tonsa* or *Acartia clausii*, *Menidia menidia* and/or any substitute organism designed to be more appropriate by EPA, Region II.

- Arsenic (mg/l)

- Copper (mg/l)

- Nickel (mg/l)

- COD (mg/)

- Lead (mg/l)

- Zinc (mg/l)

- Chromium (mg/l)

- Total solids (mg/l)

- Suspended solids (mg/l)

In addition, all permittees are required by permit condition to use EPA approved procedures and to participate in a quality control program. Samples are also collected and analyzed on a random basis by the Regional staff for verification of integrity and accuracy. Regional staff also make laboratory visits to review Quality Assurance practices.

**Question 3.** On page 6 you mention "an annual public review of information furnished by the applicant." What form does this *public* review take: Is it a public hearing? How long does it take to review at this public meeting the data provided by over 100 dumpers?

**Answer.** Regional policy has been to conduct an annual public review of information provided by permit applicants. Such hearings are conducted by the Regional Hearing Officer to receive statements on (1) the applications and (2) EPA tentative determination with regard to the application. For example, a public hearing was held on April 1, 1973 in New York City, to consider the 16 municipal ocean dumping applications in the New York-New Jersey Metropolitan area. In addition to those by EPA staff, statements by representatives of government, environmental groups and the public (total of 12) were presented for the record. The hearing lasted about three hours.

On June 12, a public hearing lasting 40 minutes was held in New York City to consider EPA tentative determination on 25 applications, mainly regarding industrial wastes. In addition to EPA staff, statements were presented by the U.S. Coast Guard and two DuPont representatives. No requests were received from other groups to make statements at this hearing; however, two environmental groups did present written statements for the record subsequent to the hearing.

A third meeting was held on July 22 in Arecibo, concerning the issuance of 8 permits to industries located in Puerto Rico. Statements were made by EPA and eight representatives of environmental groups and the public.

**Question 4.** Also, in that Table on page 2, you have under 1974, "EPA notifies Corps of Engineers of need for dredged material site change." Could you explain that to us, please? Where is the original dredged material dumpsite in

question? What sparked the need to change that dumpsite? What was the Army's response to your notice? Has the dumpsite moved as a result? To where? What has happened to the original dumpsite now? What effects are you discovering at the new dumpsite?

Answer. On October 9, 1974, a letter was sent by EPA Region II to the New York District Corps of Engineers concerning the relocation of the dredged material dump site located at the entrance to the New York Harbor. This letter requested a plan for phasing out the use of the dump site in 1976 and the use of a new site within two areas being studied by NOAA located on Mid-Shelf further out to sea. The Corps replied on December 12, 1974 that "there is no firm information indicating that the present discharge of such materials into EPA's designated site . . . has had an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery area, wildlife or recreational areas." Supplementary information was received from the Corps on July 14, 1975.

The National Oceanic and Atmospheric Administration informed the Corps on March 11, 1975 that "it is our view that it (the dump site) should not be moved at this time . . . unless navigation is hampered or it becomes a threat to human health." EPA is awaiting the completion of oceanographic studies by NOAA. Before proceeding further.

Question 5. I notice on page 4 of your statement that out of 18 man-years devoted to this program, only 1 was devoted to the development of alternatives. Can you explain this lack of effort expended in this all-important area? Don't you think the enormity of the problem in the New York Bight would justify spending more than one man-year on the development of alternatives?

Answer. The one Region II man-year devoted to the development of alternatives to ocean disposal does appear to be a low level-of-effort. However, this figure does not indicate that the total level-of-effort on this project is low, only that most of the work was being conducted by (1) EPA contractors, for example, the Interstate Sanitation Commission's (ISC) Sewage Sludge Management Studies, (2) by individual permittees, for example, industrial permittees and their consultants, and (3) EPA-ORD research into environmentally acceptable alternate disposal methods. The one man-year is therefore devoted to ensuring that EPA's program needs are adequately considered in the ISC study, in working with the industries throughout their development of alternatives either through technical consultation or advice, and in interfacing with EPA-ORD.

Question 6. In that same sentence on page 4, you say that ten man-years were spent on comprehensive monitoring. Could you describe what they did? What are EPA's monitoring activities in the Bight?

Answer. EPA's monitoring is conducted biweekly or monthly dependent on the time of year in the vicinity of the sewage sludge and dredged material dump sites and along the coastal areas of Long Island and New Jersey. Water samples are collected by helicopter from the surf along the coastal beaches. Water and bottom sediment samples also are collected by boat approximately one hundred feet from the shoreline. In addition, samples of both water and bottom sediment are collected by boat along three transects. Each transect begins in the sewage sludge dump site—one proceeding north to the Long Island coast; one west to the New Jersey coast; and the other northwest to the New York Harbor entrance. Water samples are analyzed for bacteria; sediment samples for bacteria, several toxic metals, and total organic content. In addition, special samples are collected and analyzed for pathogenic bacteria and viruses.

Question 7. In the Figure on page 7 of your statement, you show a sharp decrease in the number of municipal permits issued from 1975 to 1976. After 1976, however, the number of permits anticipated remains fairly constant. Do you reasonably expect that you could cut off all ocean dumping in 1981 after allowing the number of permits issued to remain constant for 6 years?

Answer. Based on data furnished by municipal applicants in their recent requests for new permits, the applicants plan to continue to practice ocean dumping under a compliance schedule to implement a land-based alternative by 1981; however, we recognize that this goal cannot be achieved unless the municipalities, with the backing of the governors and legislators, agree upon cost-effective approaches and provide their 25% local share of construction costs.

**Question 8.** On page 8, you have a figure showing the number of industrial permits issued. In 1975, there were more than 40 such permits. On page 6 of your statement you describe your most recent industrial public hearing held on June 12, 1975. My question is, did you hear from all 40 dumpers in one day? If so, how thorough a review of their operations could you have conducted?

**Answer.** See answer to question 8. A public notice was published on May 9, 1975, regarding receipt of 25 ocean dumping applications, the tentative determination thereon, and the scheduling of a public hearing on June 12, 1975. The audience at the hearing was made up almost entirely of industrial representatives and only three oral statements were presented other than those by EPA staff.

**Question 9.** On Table 3, on pages 10 and 11, you give the permitted volumes for each of the industrial permits. Do these permitted volumes ever change? What is the procedure followed in order for a dumper to increase the volume he is allowed to dump?

**Answer.** The permitted volumes are generally in excess of those which are transported under the permit. Usually they reflect the volumes requested in the application. On three occasions, applicants in Puerto Rico have requested and justified a need for increased volume during the terms of a permit. The Region, now that we have some experience (1975-75), in requested versus actual dumped volumes is now establishing new permitted volumes that more accurately represent actual volumes. Thus permits for excess volumes and the requests for increased volumes, after permit issuance, should be reduced.

**Question 10.** With regard to the industrial dumpers in Puerto Rico, you say on page 13 of your statement that three dumpers have submitted a scheduled alternative scheme. What is that alternative?

**Answer.** Three industrial dumpers in Puerto Rico—Schering, Puerto Rico Olefins, and Oxochem Enterprises—have prepared and presented detailed engineering reports on alternative waste treatment methods. These complex treatment techniques were designed by the industries for their particular wastes.

**Question 11.** You also say on page 13 that the 6 other industrial dumpers will participate in the Barceloneta Regional Waste Treatment System. Will this system provide adequate treatment for the toxic wastes generated by these industries? How far offshore will this system dump the wastes? How does this compare with the distance from shore they are now dumped? What about the differences in water depth? Do you really think that participation in the Barceloneta system is an environmentally favorable alternative?

**Answer.** The Barceloneta facility initially will provide primary treatment and disinfection of wastewater. Some removal of toxic materials will occur, as solids are removed through the primary treatment system. The treated water will be ocean discharged. The outfall is located approximately 2300 feet offshore in 215 feet of water. This plant is now under further preliminary design to provide adequate treatment of all municipal and industrial wastes. Under no condition will the present ocean dumping permittees be allowed to discharge their waste through this treatment plant in contravention of any applicable environmental law. The industries will be required, if necessary, to provide pretreatment to ensure that their discharge to Barceloneta will not violate appropriate water quality standards and ocean dumping criteria.

The Barceloneta system will provide adequate treatment for the industrial wastes which are presently disposed of untreated at an ocean dump site located about 42 miles off the northern coast of Puerto Rico. The system also will eliminate many existing discharges which contribute to the pollution of Puerto Rico's inland waterways. Participation in the Barceloneta system is therefore a favorable environmental alternative.

**Question 12.** You point out on page 14 that the pyrolysis system recommended by the Interstate Sanitation Commission could not be implemented until 1985. In light of your recent recommendation to use the present sewage sludge dumpsite until 1981, do you intend to continue using the dumpsite until 1985 when pyrolysis would be feasible, or do you intend to use the "less favorable alternatives, using multiple hearth incinerators?"

**Answer.** At a recent meeting of the "Executive Committee" of the ISC study of "Alternatives to Ocean Disposal," the consultant's (Camp, Dresser & McKee) project manager expressed optimism that sludge pyrolysis units could be designed and constructed by 1981. This assumes, however, that no adverse technical results are obtained in our small-scale demonstration study and that

no adverse legal-institutional problems arise relative to the location of the individual sludge pyrolysis units.

**Question 13.** In light of estimates that the amount of sewage sludge generated will probably be triple the amount generated today, will you have enough facilities to handle all the sludge in 1981 without having to resort to ocean disposal?

**Answer.** All of the facilities required to dispose of all of the sludge generated by 1981 will probably not be completed, but we will be striving for this goal.

**Question 14.** Why does Figure 3 on page 16 show a steady increase in the amount of ocean-dumped municipal sludge over the next five years? Do you intend to end ocean dumping in 1981?

**Answer.** The steady increase in volume of sewage sludge to be ocean dumped between 1976 and 1981 is attributable to the upgrading of treatment plants operated by existing ocean dumping permittees. Secondary plants produce a much larger volume of sludge than primary plants. Ocean dumping permits will only be issued to existing permittees.

It is EPA's stated intention to phase out ocean dumping of all municipal and industrial wastes by 1981, provided that the alternative methods of disposal are environmentally acceptable, technically feasible, and economically reasonable.

**Question 15.** Why does Figure 4 on page 17 show no decline in the volume of chemical and acid wastes dumped at sea over the next five years?

**Answer.** Figure 4 does show a decline in the volume of chemical wastes; however, the projected volume of the acid waste to be dumped remains constant. Both permittees who utilize the acid waste site—NL Industries (sulfuric acid-iron slurry) and Allied Chemical (hydrochloric acid-sodium fluoride)—are under an implementation schedule to phase out in 1981. To date neither company has provided an implementation schedule for an earlier phase-out date nor projections for any significant decrease in waste generated.

**Question 16.** In your press release of March 1, 1976, where you announced your recommendation to continue the use of the same sewage sludge dumpsite until 1981, you justify your conclusion on, among other things, the grounds that "dumping present volumes of sludge would not have any additional significant effect on the site." Does this conclusion have any validity in light of your testimony here today which shows (Figure 3, page 16) that the volume of sludge will not remain the same but will greatly increase over the next five years?

**Answer.** EPA does not recommend continued use of the existing sewage sludge dump site until 1981. We recommend continued use of the site as long as it does not present hazards to public health and welfare or degrade coastal water quality. We also recommend that an expanded monitoring and review process be developed to determine when and if environmental factors warrant the phasing out or abandonment of the existing dump site. This monitoring and review process will indicate when and if the existing site cannot assimilate increased volumes of sludge expected over the next five years. If this occurs, an alternate dump site would be used immediately.

**Question 17.** On page 20 of your statement, you say that "the leading edge of the sludge mass associated with the 12-mile sewage sludge dump site is located about 5½ to 6 nautical miles from the nearest shoreline." Does this leading edge move? Does its distance from shore depend on the season? When is it closest to shore? What will a great increase in the volume of sludge dumped there do to the leading edge?

**Answer.** There is an area of deposition in the vicinity of the existing sewage sludge dump site; primarily at the Christianson Basin, a natural depression just north and west of the dump site. These deposited materials may contain some sludge solids. The northern edge of this deposition area is approximately 6.5 nautical miles from the Long Island coast. However, to be on the conservative side, we generally consider the edge 5.5 to 6 miles. Studies thus far conducted do not indicate that this edge moves. The monitoring program indicated in the answer to question 16 will demonstrate whether increased volumes will cause a movement of the leading edge. No bonafide estimate can be made at this time as to how a threefold increase in the volumes of sludge dumped would affect the northern most edge of the deposition area.

However, when compared to the present effect of sludge dumped, it would appear that the increased volume should have only a small effect.

Smaller patches of mud deposits have been identified as close as 2 km (1.2 n mi) from the Long Island coast. These mud deposits contain organic rich materials and have been shown on nautical charts dating back as far as 1845. These mud patches have been known to move seasonally.

**Question 18.** On page 22 of your statement you say that "an alternate dump-site (should) be designated in the Northern Area for potential future use."

Didn't NOAA recommend the Southern area rather than the Northern area because of potential harm to the Hudson Canyon and the marine organisms which are found there?

Why did EPA choose the Northern site?

What factors led to its choice rather than the Southern side?

- Answer. There are primarily three factors which led EPA to choose an alternate dump site in the Northern Area over the Southern Area site recommended by NOAA.

First, we feel that the Northern Area site is far enough away (24 n mi) to ensure that sludge solids would not accumulate in the Hudson Shelf Valley. The EIS studies indicate that sludge solids will travel a maximum distance of about 8 n mi. Furthermore, the selected site lies outside of the prevalent current systems which would tend to carry the sludge solids toward the shore and Hudson Shelf Valley.

Secondly, the Southern Area has greater existing commercial shellfish resources than does the Northern Area. Thus, dumping would have a greater adverse impact if a site were designated in the Southern Area. Impacts on shellfish are of greater concern than on fish because shellfish are essentially non-motile.

Third, the Southern Area contains or is adjacent to identified mineral resources (oil and gas, sand and gravel). Dumping activities in this area could conflict with the potential development of these resources and could compound the potential impacts on the environment.

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**BRIEF RESPONSES BY GERALD HANSLER TO QUESTIONS POSED BY  
CONGRESSMAN JOHN M. MURPHY**

**Question 1.** What volume of waste materials has been dumped in the New York Bight over the last few years?

Response. During 1973-1975, approximately 4 to 4.5 million wet tons/year at the sewage sludge dump site, 2.0 to 2.8 million wet tons/year at the acid wastes site, 185 to 455 thousand cubic yards/year at the cellar dirt site, and 350 to 550 thousand wet tons/year at the chemical waste site.

**Question 2.** How many permits have been requested for ocean dumping in the Bight over the last few years?

Response. One hundred and thirty four (134) applicants have requested permit to ocean dump between April 1973 and February 1976.

**Question 3.** What is the size of your staff that handles these requests?

Response. In FY '76, six (6) man-years were allotted by Headquarters for this program. However, eighteen (18) man-years of effort were devoted in FY '76 to administer Region II's Ocean Dumping Program. Five of these man-years are used for permit application review and issuance. The remaining man-years are devoted to comprehensive monitoring development of alternatives, evaluation of environmental impacts, and enforcement.

**Question 4.** How many of the permit requests have been granted? How many have been denied?

Response. Of the 134 applicants, 20 were either denied or withdrawn, the remaining 114 were issued. This number does not include many potential applicants who were discouraged by my staff.

**Question 5.** What alternatives to ocean dumping have been considered in the New York area?

Response. Generally, the alternatives evaluated fall into the following three categories: industrial wastewater treatment, incineration or pyrolysis for land application.

**Question 6.** What has been the decision process that led to the Environmental Protection Agency's proposal to shift dumping sites in the Bight? At what stage is that decision process now?



Response. In mid-1973 the Region assessed future needs and problems associated with handling the municipal sludges in the metropolitan area. It became clear that the construction of new and improved wastewater treatment facilities under P.L. 92-500 would increase two to threefold the amount of sludge being generated by the present permittees. Thus, in late 1973, EPA, with the cooperation of NOAA, began to consider the possibility of designating an alternate sludge dump site. An Environmental Impact Statement is presently being prepared to evaluate sewage sludge dumping activities in the New York Bight. The decision for selection and use of a new dump site will be made after completion of the EIS, and public review and comment through the public hearing process.

*Question 7. What factors were considered in making that decision?*

Response. In general, the following factors for selection of new dump area were considered: (1) on-shelf dumping, because of the unknown environmental risk associated with off-shelf dumping of solids; (2) due to economics and logistics, the site should be no more than 65 nautical miles from the harbor entrance; (3) location of the new site should minimize the chance of beach contamination; and (4) the site should minimize, to every extent possible, any adverse effect upon living marine resources.

*Question 8. What is this new dumpsite which is under consideration?*

Response. In consultation and coordination with NOAA, two areas are being considered as a possible location for a new dump site.

*Question 9. What coordination has there been with NOAA in this consideration? Has their input been helpful? Has their advice been heeded?*

Response. Close coordination between the NOAA-MESA and EPA staffs are being maintained. In fact, there's almost daily telephone communications between my staff and the NOAA-MESA office in Stony Brook, Long Island. The environmental data collected by the NOAA-MESA project have proved to be invaluable inputs to this Region's decision making process.

*Question 10. What pressure has there been from Washington to follow the example set by the Regional Administrator of Region III in the case of Philadelphia's dumping, and phaseout New York's dumping? How feasible an alternative is the phasing out of dumping in Region II?*

Response. EPA Region II, in full coordination with Headquarters, has administered the ocean dumping program from its inception with the stated intent to phase out ocean dumping of municipal and industrial wastes by 1981, provided environmentally acceptable, technically feasible, and economically reasonable alternatives could be developed and implemented.

*Question 11. What long-term solutions is Region II examining?*

Response. A technical examination of applicable alternative methods for disposal of sewage sludge is presently being investigated by the Interstate Sanitation Commission (ISC) under EPA contract. The Phase I ISC Report, which was completed in June 1975, recommended two basic disposal systems for the metropolitan area: (1) filter press dewatering of sludge and incineration and/or eventual pyrolysis with maximum energy recovery, and (2) land application where sufficient demand exists for a soil conditioner or fertilizer produced from sludge, and where the application rate amply protects public health and welfare.

Mr. MURPHY. Our next witness is Mr. Scott Lilly, general counsel, Power Authority of the State of New York.

**STATEMENT OF SCOTT B. LILLY, GENERAL COUNSEL FOR THE  
POWER AUTHORITY OF THE STATE OF NEW YORK, NEW YORK,  
N.Y.; ACCOMPANIED BY ANGEL MARTIN, LICENSING AND ENVIRONMENTAL  
LAWYER**

Mr. LILLY. Mr. Chairman and committee counsel, I appreciate the opportunity to appear here. I have with me Mr. Angel Martin who is our licensing and environmental lawyer, also a professional engineer and also an alumnus of EPA.

My statement is short, so if you will bear with me, I will read it.

First, however, I am sure the chairman is very familiar with the Power Authority but for the benefit of anyone who may not be, let me say that we are a State organization, a public benefit corporation, we finance and build electric plants without any tax money, without any use of the State credit.

We are a wholesaler. Our customers include municipal electric systems, rural electric cooperatives, some so-called high load factor industries which means industries whose need for electricity is great and will have to have a low cost electricity.

We supply about 25 percent of the electricity in the State of New York. Some of our hydro goes to Vermont and oddly enough, the percent that we supply in Vermont, percent now, not quantity, is more than it is in New York.

As a result of recent legislation we will add many customers in the New York metropolitan area, particularly the Metropolitan Transportation Authority, the Port Authority, the city itself and State and Federal agencies that operate in the New York metropolitan area.

For that purpose we are planning several new facilities, one of which is a 700 megawatt fossil-fired plant proposed to be built on Staten Island at the junction of Arthur Kill and Fresh Kill.

As a small description of the plant itself, it will occupy approximately 185 industrially zoned acres adjacent to an existing Con Edison plant.

To the southwest of the site is a 2,800 acre sanitary land fill operated by the city. Directly across the Arthur Kill are a number of chemical, refining and industrial installations. The plant is planned to be coal fired, but it will have the capability of getting 20 percent of its heat input from refuse.

That will amount incidentally to about 2,000 tons a day or I believe it is something in the order of 80,000 cubic feet per day.

The plant will also be able to burn oil if that should ever again be an economical available fuel or in case of any temporary cutoff in the coal supply.

Recognizing the peculiar environmental concerns of the metropolitan area, we plan to equip the plant with the latest in air and water pollution control devices, including highly efficient electrostatic precipitators, flue gas desulfurization equipment, and water and waste treatment facilities. In addition, the boiler is designed to keep nitrogen oxide emissions to a minimum. All of this equipment will add something over \$110 million to the cost of the basic plant.

The plant has been scheduled for commercial operation in 1980. However, the actual date of operation is very much dependent upon the speed of the regulatory licensing process. I am not sure that speed is the right word. Our application for certification of this plant, which was filed with the New York State Siting Board in December 1974 has not yet been docketed.

Mr. MURPHY. It is called deliberate speed.

Mr. LILLY. Due deliberate speed. The law which this commission is operating under is meant to provide one stop licensing power plants. It has in fact produced a full stop.

In order to understand the problems associated with the disposal of the plant's solid wastes, I would like to describe the plant's operations which produce the wastes.

They come principally as a result of burning about 1.7 million tons of coal annually. This coal which will contain approximately 3 percent sulfur will result in approximately 160,000 tons a year of fly ash and approximately 45,000 tons a year of bottom ash.

These are collected and must be disposed of in an environmentally acceptable manner. Perhaps I should point out in mentioning fly ash that the point of the precipitator is to stop it from flying.

In addition, as a result of the coal's sulfur content, flue gas desulfurization equipment, commonly called a scrubber, must be installed to reduce the sulfur dioxide in flue gases leaving the plant to an environmentally acceptable level.

There are several processes currently being marketed which will remove sulfur dioxide. As a result of the different chemical reactions which each process employs, different quantities and types of waste product result.

The state of the art in sulfur scrubbing is relatively new. We are on the steep upward slope of the learning curve.

Now the Authority is investigating three basic scrubbing systems.

First there is a nonregenerative, sometimes is called a throw-away, limestone scrubbing system. That would result, depending on whether lime or limestone is used, in approximately 450,000 to 560,000 tons a year of scrubber sludge as an end product.

Second: We are investigating two regenerative processes. A soda ash system which would produce an end product of 160,000 tons a year of sulfuric acid.

Third: A variety of the same soda ash system which would produce about 52,000 tons a year of pure elemental sulfur.

All these numbers are based on coal burning. Burning some refuse, as we expect to do, would add to the ash disposal problem but it would reduce the desulfurization and sludge disposal problem.

Now, before going on with the prepared statement, I would like to put in this comparison. If the same amount of electricity came from a nuclear plant, you would take a year to develop as much solid waste as will have to come out of this plant in 3 hours.

That does not mean that I am now saying we should not have any coal fired plants. I do not think we can possibly afford to rely on any single technology. But it is a very substantial advantage of the nuclear plants that the solid waste problem is virtually not a problem.

Mr. MURPHY. When you talk about the amount of sludge generated by nuclear versus fossil plants, what about the input tonnage?

Mr. LILLY. Also very much less. The 3,000 to 1 ratio I gave you for disposing of solid waste from a nuclear plant is not far from the ratio of material that must be moved to the fossil plant as fuel.

This should weigh something on the plus side. Remember the 2,000 tons a day of solid waste that our fossil plant can get rid of and, of course, the nuclear plant has no such capability.

Mr. MURPHY. Fifty-six nuclear plants in the United States last year used two truckloads of fuel. Compare that with all the coal fuel and the number of ships going in and out of here bringing in oil as well as other types of fuel. That is the example of input which is far more dramatic than the output.

Mr. LILLY. It is.

Back to this committee's concern with solid waste disposal. The authority, as the chairman pointed out, has not yet selected the method it will use. That decision, according to our current engineering schedule, does not have to be made until early 1978. Postponing the decision improves our ability to make a better choice based on greater experience.

The choice of the disposal method, of course, depends on the scrubbing system that is finally adopted.

If the limestone process is used, the total solid waste emanating from the plant including fly and bottom ash would be, as you said, Mr. Chairman, on the order of 700,000 tons a year.

This waste, assuming it were all mixed together, would start with a consistency similar to toothpaste. However, with the addition of appropriate fixing agents a hard stable product can result—somewhat similar to concrete.

Mr. Chairman, I would like to show you a sample. Now that particular sample has only sludge and fixative in it. It does not have fly ash.

If you add fly ash you get something that is not so hard and certainly, so far as any kind of water disposal, would not be as good.

The others, however, can be used for land fill. I have also seen samples, Mr. Chairman, that seem to me a little bit harder than that one.

The tests so far performed on this stabilized sludge show that it is highly impermeable and has an extremely low leachability.

The ways of disposing of such a product are numerous. It may be used in land reclamation, in embankment construction, roadways, parking areas, airfields, and generally as a substitute for aggregate.

In addition, and of particular interest to this committee as long as ocean dumping of nontoxic stable material continues to be lawful and economical, ocean disposal offers a possible alternative for the plant's solid waste.

Ocean dumping of stabilized sludge should not cause environmental harm to the marine environment and it could provide a practical source of clean stable fill for construction or extension of offshore islands.

Another way of disposing of stabilized scrubber sludge which we had investigated is the use of abandoned quarries along the Hudson; 16 upstate quarries have been investigated.

I might say a primary problem with the quarries is the quantity. One quarry doesn't last more than a few years. Authority has also been approached by a firm which has offered to dewater, fix and remove the sludge and barge it to a 4,000 acre land disposal site in New Jersey.

Another interesting alternative is being offered to us by a firm which would supply limestone mud from the Bahamas and use the same tankers to take the sludge back to the Bahamas.

Turning now to the regenerative type scrubbers, the disposal problem associated with them is somewhat easier. If a regenerative system is employed which produces either sulfuric acid or elemental sulfur, only bottom ash and fly ash must be disposed of because the sulfuric acid and the sulfur are potentially marketable products.

I might anticipate a question. The sulfur particularly if there is no market for it, simply adds a modest percentage to the amount of ash you have to get rid of. It is an inert substance that doesn't cause a lot of problems.

As the magnitude of the fly and bottom ash is only about a third of the total volume of 700,000 tons which was mentioned before, the magnitude of the disposal problem is greatly diminished.

In conclusion, while a considerable amount of solid waste, let us face it, a large amount, will be generated by our proposed plant, there are many acceptable ways of disposition of it, some of which may turn potentially troublesome waste into a useful or even a marketable product. All of them require off-site disposal.

With respect to this subcommittee's particular responsibility, while we recognize the need for safeguards and extremely careful control, we would recommend against any absolute prohibition which would prevent dumping of harmless stable materials in any part of the ocean.

By that I mean there might be areas of the ocean where you would say nothing goes there for some reason. But, we would recommend there should be some areas where a product such as you have looked at might be disposed of.

I want to emphasize that you should not take that recommendation as being a decision, even a tentative one by the power authority, that that is what we want to do with these products.

As I said, we have not decided what the process is that we would use. Therefore, we do not yet know the quantity or character of the solid waste. Undoubtedly, some methods would produce products quite unsuitable for ocean disposal.

As I say, we will try to get all the information we possibly can before we reach that decision in the hopes of making the best decision we can.

Thank you.

Mr. MURPHY. Mr. Lilly, does the power authority generate any sludge at this time?

Mr. LILLY. No, sir.

Mr. MURPHY. Are you aware of the New Jersey law that prohibits any dumping in their State from out-of-State sources?

Mr. LILLY. Well, I am aware that such a law was either under litigation there or proposed. I had not understood it was an existing law.

Mr. MURPHY. The only fill—I use the fill advisedly—that New Jersey wants from New York is the high-grade gravel from our bay so they can build economic facilities to compete with those in the New York City area.

The State of New York grants them permits for that to go out.

Mr. LILLY. I would gather from what we have been told by the company that approached us that they probably claim grandfather rights to do what they have offered to do. I am not sure of that.

Mr. MURPHY. You state on page 5, that so long as ocean dumping of nontoxic, stable and nondeliterious material continues to be legally authorized and economically viable, ocean disposal offers a possible alternative to the plant's solid waste.

Are you aware that the goal of the act is to eliminate all ocean dumping by 1980 or 1981, so that ocean disposal may not be a possible alternative?

Mr. LILLY. Yes, sir. It was for that reason that I made the recommendation I did because it seemed to me on the surface that the objective of preventing the deposit of anything, whatever, in the ocean, might not be the right way to go at it, that there could come a time, I should think, when you might actually want some of this quasi-aggregate that we might produce and it would be useful.

We do not claim to make now a judgement that that is true. Far from it. But I would hate to have the law so amended that it would have to take another act of Congress before one could reach a conclusion like that.

Mr. MURPHY. You state that the dumping of stable sludges or materials on the ocean floor causes no deleterious effect. Do you have any scientific knowledge or data to back up that opinion.

Mr. LILLY. That kind of data would certainly have to be available before any such thing was done, and I could imagine areas in which it would not matter what the material was, it would be harmful.

Mr. MURPHY. With regard to the use of abandoned quarries in the Hudson, what effect would disposal of your sludge have there and what could the area be used for after it was filled with the sludge?

Mr. LILLY. Well, up to now we have not identified any significant effect of putting it there, except land use itself.

The quarry would not be available for other possible uses, that is a problem in that some people might prefer to fill the quarry with water or something else.

If in fact it were used to dispose of this material, when it was filled, you would simply have a new land area and it could be built on.

You would have a flat space instead of a big hole. Mr. Martin. I might add that I think some tests have been performed by companies that are now engaged in this process of fixing scrubber sludge, on leachability, and the product that was passed around today indicated an extremely low leachability which would indicate a very minimal effect on ground water contamination.

Mr. MURPHY. Counsel, any questions?

Mr. SMITH. Mr. Lilly, if the law is not changed and your plant does go ahead and produce the sludge that you state in this testimony, do you think the power authority is prepared to make the necessary scientific evaluations yourself in order to prove your case that, in fact, the sludge which you are going to be dumping or proposing to be dumping is harmless to the marine environment?

Mr. LILLY. I would not expect that we would do that by ourselves. In the first place, the utility industry carries on a great deal of research through EPRI and others. The Government carries on research.

I believe that if we had to carry the entire research burden, it would make the idea quite uneconomical. What I am prepared to say is that the dumping should not be done unless the research is done by somebody.

Mr. SMITH. Thank you.

Mr. MURPHY. Thank you, Mr. Lilly. We certainly appreciate your testimony this morning. I would appreciate it if you or Mr. Fitzpatrick would let me know prior to the departure of the first barge where you intend to dump that sludge.

Mr. LILLY. We certainly will. We may even get you for the pilot.

Mr. MURPHY. The next witness will be Mr. Charles Samowitz, commissioner, Department of Water Resources of the city of New York.

Mr. Samowitz.

**STATEMENT OF CHARLES SAMOWITZ, COMMISSIONER OF THE  
DEPARTMENT OF WATER RESOURCES OF THE CITY OF NEW  
YORK; ACCOMPANIED BY NORMAN NASH, DIRECTOR OF WATER  
QUALITY FOR THE CITY OF NEW YORK**

Mr. SAMOWITZ. I have here with me, Mr. Norman Nash; he is the director of water quality for the city of New York and he is chief of our research and development unit.

I would just like to preface my remarks with a little statement about money.

Gerry Hansler mentioned it went to something like half a billion dollars to create the alternate to sludge disposal. It is my assessment that neither the State or the city will be able to fund their share which totals 25 percent in the next few years.

Mr. MURPHY. That is 25 percent?

Mr. SAMOWITZ. Of the half billion.

Mr. MURPHY. Of the half billion for alternate sludge disposals.

What about their share of the federally funded program for sewer separations and primary and secondary treatment facilities?

Mr. SAMOWITZ. You have anticipated my next remark which is in the cash flow program for the next 3 years, I would have a program of three-quarters of a billion dollars. These are in Federal and State allocations. I have a program of about \$45 million.

That includes State, Federal and city moneys.

Mr. MURPHY. Those are 70-30 programs?

Mr. SAMOWITZ. Those are 75-25. It is very close. 75-25.

The State of New York owes the city of New York \$13 million for prefinancing the existing program. And it was worse 1 month ago when they owed us \$20 million.

If the State of New York cannot get its share, they will be jeopardizing my on-going construction.

Now, I am here to make a plea. I certainly agree with the goals of your subcommittee and your own personal goals, which is to end disposal at sea. There is a mechanism in Public Law 92-500 which provides Federal backing for municipalities and local government, including the State, for backing their obligations. In section 12, the Office of Management and Budget has never been in favor of it and it is my understanding that Federal EPA and the administration is not for it.

If they would purchase New York City obligations and perhaps New York State, we can reinvigorate the city in a vital reconstruction program. We can also join hands and restore the heritage of the harbor and of the bight.

So, therefore, I urge you to use your good influence to see if we can implement section 12 of Public Law 92-500.

Mr. MURPHY. My good influence might be better with the next administration.

Mr. SAMOWITZ. Further, there is H.R. 95-60. We have worked together on this, Congressman. New York City has owed something like a quarter of a billion dollars for work done prior to 1966. It is 10 long years, but we still have faith in the Federal Government and we hope that this act will be passed and its vitally needed funds which the city outlayed will be restored because the state of the city's finances are not the same as it was in 1966.

Now the city of New York operates 12 water pollution control plants, massive ones. Most of them were originally built entirely with city money. We capture 82 percent of the flow; 11 of these plants dispose of their sludge at the dumping grounds 12 miles offshore.

By the early 1980's we should have 14 plants, designed for ocean disposal. Of course only 13 will go out to sea, as you know. Oakwood Beach will pump its sludge over to Port Richmond. The volumes of sludge will increase from the present of 90 million cubic feet per year, to 220 million cubic feet per year.

Now recently I sat down with my opposite numbers from the major contributors to the disposal site, the Passaic Valley chief and also the one from Middlesex. They felt I was creating a problem. The problem I was creating was that we were building nine major plants, rebuilding them, in fact, upgrading their level of treatment, and thus I would be seriously increasing the volumes at the sludge disposal site.

I think New York City is to be commended and pardon me for throwing bouquets at New York City, but I think they need a few, for conducting this massive program at this level and bringing it in on time.

Just recently the State of New York, unannounced, decided to withdraw its aid for operation and maintenance. That is one-third of my aid. The mayor and the budget director asked for my assessment if we had to absorb this drop. What that meant was that 60 percent of my treatment facilities would have to shut down.

The consequence the impact of that, with that we would be discharging raw sewage in the inner harbor. We would be generating hydrogen sulfide. We would not have a city that would not be a fit place to live.

That might have helped ocean disposal, but it would have created a much worse problem.

I therefore say that the Federal Government should consider the consequences of this massive building program for ocean disposal and for secondary treatment and help local government with operation and maintenance.

And I say this from a position that New York City gives \$18 billion to the Federal Government in income tax and gets back roughly \$2 billion.

I think some of this should come back. Now, our present contribution to the dump site is about 58 percent of the total volume. When



all the plants in the bight are constructed, both in New York City and in the region, our share will drop to 34 percent.

What this obviously means is that New York City with its own contributions, has built a treatment program without Federal aid, without State aid, with our own money and our own convictions.

We did not, and do not, enjoy ocean disposal, for obviously it dispoils the immediate area, but it must be emphasized that there were no other means for disposal of large volumes of sludge.

Our purpose was to reclaim the city's harbor waters for the protection and enjoyment of our citizens, and we used a legally designated area far enough off shore to avoid contamination of our own and our neighbor's beaches.

However, we always have sought other disposal methods. For years we discharged millions of cubic feet of digested sludge on completed landfill sites in Brooklyn and Queens, and we created the marine golf course and several other areas that are now being converted to parks.

We would dearly love to continue this program, but these vacant parcels of land are gone.

Thus, our only other option was closed to us. But about 10 years ago, before the present era of ecological awareness, New York City decided to adopt a relatively untried process which did not involve ocean disposal. This was the wet air oxidation treatment of sludge—heat treatment under pressure—followed by centrifuging and drying to produce a small amount of powdery material that could be incinerated or disposed of on a landfill. We designed one of our new plants on this process and, if the Federal Government had not impounded the funds for its construction, that plant, that prototype plant, would now be well into construction. That was to be our prototype sludge processing plant; if it were successful, we were prepared to incorporate the process into all our plants and end ocean disposal then and there, without prodding from anyone.

However, New York City now is a member of the Regional Sludge Management Committee, which has been seeking a regional solution to sludge disposal. A Federal EPA grant to the committee has resulted in a recommendation that pyrolysis of sludge be adopted in the area including the city. I can tell you that the concept of a single sludge disposal area for the entire bight is untenable, unworkable. I would gladly send my sludge to New Jersey but New Jersey would not accept it and they cannot send their sludge into New York City, so therefore we have to face the political realities of life and realize that each authority, each sanitary district, will have to provide facilities for its own sludge.

In the opinion of the consultants, wet air oxidation, the process we have designed for our new Red Hook plant, was not as economical to operate as pyrolysis.

We must remember that this was considered and analyzed prior to 1973, prior to the present energy crunch. Frankly, we are not completely sold on pyrolysis, but we are willing to go along with a pilot plant installation, either in New York City or in a neighboring county.

The primary problem with the pilot plant is the funding—where will the money come from? Can we get up our share, even if it is

funded 75 percent by the Federal Government? And if it is successful, who will provide the much larger sums for the four regional plants contemplated within New York City?

I can tell you flatly it is not the city. Nor, for that matter, do I see the State being able to fund it.

Thus, although we are willing to end ocean disposal, we are desirous of ending ocean disposal, it is obvious that for a number of years more we must continue.

But why should ocean disposal be ended entirely? This issue has been beclouded by emotionalism and near hysteria generated by well meaning but what I consider ill-informed environmentalists.

What should have been a rational discussion, based on scientific observation and judgement, has been turned into arguments about dead seas, grease balls on beaches and alarms about threats to property values and safe bathing waters.

None of these boogeymen have turned out to be real, except the dead sea at the dumping ground, and that should have been expected. After all, can wastes of any kind be deposited anywhere without harming the immediate area? Is not the very earth below Great Kills which is a refuse landfill, has that not been sacrificed. What has been overlooked by the opponents of ocean disposal is that 50 years of use have not contaminated the beach waters of New York and New Jersey.

And the best bathing beach in New York City, in terms of water quality, is the Rockaway Beach, and that is the one that is closest to the disposal point.

Furthermore, sewage sludge contributes only a very minor part of the total contaminants added to the New York Bight. I think Commander Swanson who will follow me, will bear that out.

At most, we are accountable for 10 percent of the COD and that ranges down to 0 for the coliform.

Most of the bight contaminants are from other sources, dredge spoil, chemical and acid wastes, river flows, urban runoffs, treatment plant effluents, and even atmospheric fallouts.

I might point out that the sludge that this New York City contributes is digested sludge which is almost chemically inert.

This is not to say for the other sludge contributors, but eventually with their plant programs they will reach the level that we are at now.

Now nothing is free; everything must be paid for. But the Federal EPA, by their plan for shutting down the present dumping ground and opening a new site in a virgin area as much as 50 miles offshore, is proposing that we pay for it twice.

We have already degraded the benthic layers, the lower bottom, at the given area; why despoil another area? Their order which to my knowledge has not yet been withdrawn, which is to take effect sometime this year, would do just that, to spoil another area and moreover, one close to a choice fishing ground.

We cannot on environmental grounds see the justification for such a move. But we can see the cost to the city; it is huge. It would double our cost, from an estimated \$2.5 million now to immediately \$5 million and in 1981, that will go to \$7.1 million.

To my way of thinking that is literally pouring money down the drain. Money that we do not have.

The Federal EPA is alone in its insistence that the disposal site be moved. It has disregarded the recommendation of the National Oceanographic and Atmospheric Administration that the present site be retained, NOAA has warned against premature condemnation of another area.

Although NOAA and we ourselves agree that ocean disposal should be ended. We hope the recent report of Dames & Moore which confirms NOAA's position will be adopted by Federal EPA.

Perhaps the ocean cannot accommodate the larger volume of sludge that will ultimately be produced by all the communities in this area, but it may also be true that the air, as a result of pyrolysis or other methods of combustion, such as incineration, would be overburdened, too.

It seems to us that a balance will have to be struck; surely the ocean can absorb some volume of sludge. Let us retain the present site for the immediate future. Let the Regional Sludge Management Committee continue with its work—assuming that the money can be found—let us experiment with the thickening of sludge to reduce the volume, and, above all, let us not be ordered into actions which will only transfer the problem to the air and to other areas of the ocean and impose an unendurable financial burden on the suffering taxpayers of the city of New York.

Thank you.

Mr. MURPHY. Thank you, Commissioner Samowitz, for a very effective statement.

With regard to the two alternative methods of wet oxidation and pyrolysis, how far off is the city from any type of installation such as that?

Mr. SAMOWITZ. I have personally investigated the pyrolysis plan right outside in northern Miami and it works. The simpro plant, not the pyrolysis, the simpro plant. It is a working module.

In other words, we could upgrade it to our level. You have a small plant. It is a million gallons per day and they wind up after 10 hours of operation in a 24 hour period with 1 garbage can of what looks like grit. It works very well.

However, the energy consumption is prohibited. It looks like a bill of about 60 million dollars per year for Red Hook. Normally, a normal plant would involve about a million. That is why we have not completely designed. We are taking a look at what pyrolysis may bring forth.

Mr. MURPHY. Milwaukee makes a fertilizer out of their sludge. Have you investigated that?

Mr. SAMOWITZ. Right. That is milorganite. It costs them more to subsidize what they sell than it costs me to dispose of sludge. That is a very expensive procedure, but we must remember they are in a portable watershed area. I am on a saline estuary.

Mr. MURPHY. Do you have any interaction with other sanitation or water commissioners throughout the country for an exchange of ideas as to how to meet this problem?

Mr. SAMOWITZ. That is correct. I am a member of AMSTA, which is the Association of Metropolitan Sewerage Agencies. I am chair-

man of a committee of the National Water Pollution Control Federation.

I am in very close contact with my equal, with colleagues in Los Angeles, Mr. Parkhurst and Bob Lyman in Chicago, Carmen Guarino in Philadelphia. We work very closely together and we exchange information.

I can tell you that in practical terms there is no engineering solution for which I would commit any money on plant scale, excepting simpro, the sim process.

Mr. MURPHY. You were aware, of course, Administrator Hansler of EPA recommended extending to 1981 the date of the dump site. With a little mathematics, we see where we can go from 155 million cubic feet over a 4-year period to 650 million cubic feet of dumping.

Were you aware of that?

Mr. SAMOWITZ. Yes.

Mr. MURPHY. That doesn't look like any taper off or reduction. In fact, we are going the opposite direction from what the intent of the Ocean Dumping Act was.

Mr. SAMOWITZ. Well, this massive program that we have engaged in with Federal funds only compounds the problem. We are doing an efficient job. We will be extracing more pollutant from the inner harbor. Now it has to be disposed of somewhere. Naturally it will go to the dump site.

However, we have some very promising experiments with coagulents, thickening the sludge. We can, I think, without too much cause substantially reduce the volumes.

However, of course the amount of pollutants itself will be the same. What we dispose of is about 3 or 4 percent solid. We could dispose of the same amount at 8 or 9 percent.

So we would effect reductions in millions of gallons per day, but we will have the same pollutant. I think Federal EPA tells me that we will not overwhelm the Hudson canyon if we can accomplish that.

But I wish to emphasize again this was a very promising pilot plant that we developed at our own expense.

Mr. MURPHY. Counsel?

I would like to publicly thank you for your assistance in keeping construction going, of the Port Richmond primary and secondary treatment plant. We could have had an \$80 million facility sitting idly by, 10 percent from completion, if it had not been for your firm recommendation to the Emergency Financial Control Board to continue that facility.

I appreciate your assistance.

Mr. SAMOWITZ. I may point out that the two jobs that they saw fit to give me the cash flow, one is E.L. 30 in the Oakwood Beach area, and the other is 6C, likewise feeding into Oakwood Beach.

Those are the only two I have in the next 3 years. \$40 million out of three-quarters of a billion, because we cannot get up our share.

I share with you bitterness because we have had great plans for Staten Island that are all developed, that are all in the Federal cash flow, they are all in the State program and I hope I can call upon you to see if we can unlock them.

Mr. MURPHY. Hopefully we will.  
 Thank you very much, Commissioner Samowitz.  
 The committee is going to recess until 2 o'clock.  
 [Whereupon, the committee recessed at 12:15, to reconvene at 2 o'clock.]

#### AFTERNOON SESSION

Mr. MURPHY. The subcommittee will come to order.  
 The Chair apologizes for the delay.  
 The ICC had a new ruling, 621, in its relationship with the Federal Maritime Commission and the International Shipping Association asked me to explain it.  
 I was so clear in the explanation that the questions ran overtime.  
 Colonel Hunter, we are pleased to have the Corps of Engineers as our next witness.  
 If you would, identify the gentleman with you for the record.

#### STATEMENT OF COL. THOMAS C. HUNTER, JR., DISTRICT ENGINEER, U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT; ACCOMPANIED BY JOHN ZAMMIT, CHIEF, OPERATIONS DIVISION, NEW YORK DISTRICT; AND ROBERT M. ENGLER, MANAGER, AQUATIC DISPOSAL RESEARCH PROJECT, DREDGED MATERIAL RESEARCH PROGRAM, ENVIRONMENTAL EFFECTS LABORATORY

Colonel HUNTER. Yes, sir.  
 On my left is Mr. John Zammit, who is my Chief of Operations and runs the regulatory program for the district.

On my right is Dr. Robert Engler, who runs the Corps of Engineers' aquatic disposal research program at the U.S. Army Waterways Experiment Station in Vicksburg, Miss.

I appreciate the opportunity to testify as a witness on the activities of the New York District Corps of Engineers on the matter of disposal of dredged material in the New York Bight and its relationship as to implementation of the Marine Protection, Research, and Sanctuaries Act of 1972.

Before addressing the specifics of our regulatory program, I would like to briefly highlight some important considerations relating to the disposal of dredged material in the New York Bight.

Based on your earlier comments, Mr. Chairman, I may be preaching to the choir, however in my association here and in the New York district I find it is necessary to turn back and look at why we do this work.

For many years, economic development took place along the banks of our waterways and coastline, New York was one of the first.

As the vessels became larger, the need arose to deepen portions of the waterways by digging channels. Economic considerations still play a large part in the requirement to maintain the waterways in New York Harbor, the Nation's largest port, with annual commerce in excess of 200 million tons.

The port will no doubt find that it is in its best interest to keep pace with the modern cargo vessels requiring deeper channels.

The economic impact of the Port of New York to the surrounding region is tremendous.

There is no doubt that the economy of the New York region depends to a large degree, on the ability to keep its waterways open to navigation for modern vessels. Trends indicate the continued use of these waterways for commerce.

Maintenance of the many federally improved waterways serving the numerous waterfront facilities in New York Harbor is a large undertaking.

These channels range from small recreation and barge channels to major ship channels. Annual disposal for the past 3 years has ranged from 8 to 13 million cubic yards, with an average annual disposal of 11 million cubic yards.

Other than new work, which is essentially virgin material, I see no increase in these quantities. All but the small amounts of this material utilized for local landfills or beach protection purposes—one which is under contract now—are disposed of at sea. It is the sheer quantity of the dredged material which virtually dictates disposal in an open water location.

The dredged material is currently disposed of at a site in the New York Bight located about 6 miles east of the New Jersey coast and about 12 miles south of Long Island.

It must be noted that dredged material is not the only material being dumped in the bight. Other materials such as sewage sludge, cellar dirt, waste acids, wrecks, and toxic chemicals are also being disposed of in the bight.

Surface runoff from precipitation and river flow provides a constant source of sediments which deposit within the port. In addition to the natural sediment load, industrial and municipal waste waters are discharged into the harbor.

It is the contaminants in this waste water which adheres to the particules of dredged material and is most often the source of pollution concern.

This contamination process, if found to be a significant problem after completion of research studies now under way regarding dredge material disposal, may be viewed as an interim condition if schedules for limiting and treating discharges can be met.

Generally, any disposal method selected is almost always unacceptable to someone. Should research reveal that our current practice is unacceptable, we will have examined alternative methods.

Recently a preliminary report prepared by an architect engineer firm under contract with the New York district examined various disposal schemes; they include upland fills, rail shipment or pipeline delivery to abandoned mines, and diked areas.

Of the alternatives to disposal in the bight, preliminary economic analysis lead to containment areas. The areas must be sufficiently large to hold the vast quantities of dredged material.

The danger of construction failure also exists. Since these areas would be built relatively close to existing coastlines, any failure would lead to significant environmental problems because the material contained therein would be sufficiently polluted to warrant contained disposal.

In addition, the cost of such a method would be more than double the present cost of disposal in the New York Bight. On the other end of the spectrum, filling of abandoned mines in Pennsylvania was found to be some 14 times more costly.

As I mentioned earlier, to keep pace with modern transportation needs, it is desirable to deepen channels for these larger, deeper draft vessels.

A study is now underway, for example, to deepen Kill Van Kull—Newark Bay channels.

Some 30 million cubic yards of material will have to be removed and deposited somewhere. This essentially virgin material should pose no threat to the bight, although it may by present test criteria, be classified polluted.

We are planning on disposal in the bight. Should this option not be available, the economic picture and in turn the cost-benefit ratio will be significantly different.

Should adequate disposal sites not be available for dredged material, thereby reducing the frequency of dredging, we will lose channel depth.

Shallow channels would limit traffic to smaller size vessels or vessels in underloaded condition necessitating more vessels to carry the same commerce.

Increased accidents could occur due to increased traffic density, and increased lightering would provide more opportunity for spillage.

Other areas of impact would no doubt be the (1) decreasing competitive desirability of the New York area with respect to shipping and dependent business; (2) relocation of businesses resulting in a decreased tax base and reduced employment opportunities.

Both are critical to municipal services and standards of living in an urban area.

In order to maintain navigation, we either have to limit vessel draft or remove the material. If public policy dictates the latter, we must dredge.

I would now like to go over the regulatory procedures.

Corps of Engineers regulations require that a determination be made that any proposed dumping of dredged material will not adversely affect human health, welfare, or amenities, or the marine environment, ecological system, or economic ~~potentialities~~ to an unreasonable degree.

Moreover, the regulations provide an opportunity for public hearings and support the selection of ocean disposal sites in accordance with criteria promulgated by EPA on October 15, 1973, and published in title 40 of the Code of Federal Regulations, part 227. To the extent feasible, they require the use of recommended sites and the avoidance of EPA-designated critical areas.

The regulations further provide, pursuant to the act, for an independent corps determination of the need for the dumping. This determination is to be based on an evaluation of the potential effect which a denial of a permit would have on navigation, economics and industrial development, foreign and domestic commerce, and on other possible methods and locations for disposal.

Corps construction of new ship channels and periodic maintenance dredging of existing channels are often affected by the act. Besides private dredging, all Federal, including corps projects involving ocean disposal are processed in accordance with the corps' regulations.

These regulations require extensive coordination with other Federal, State and local agencies, as well as the general public, before the proposed disposal can proceed.

Most of the non-Federal applications we receive for ocean dumping permits are from port users required to dredge berthing areas and approach channels adjacent to congressionally authorized channels.

In practice, the private sector may initiate requests for the dumping of dredged material by application to me. Along with construction plans, a permit applicant must submit results of tests performed on the proposed dredged material in accordance with EPA adopted criteria.

These tests include analysis of the physical composition of the material and the standard elutriate test. The tests conducted under these regulations do not establish toxicity to marine organisms, but indicate whether material is considered polluted or not in accordance with EPA criteria.

Applicants are also requested to submit data regarding alternatives to ocean disposal which they considered, as well as their reasons for rejection.

Along with public and agency notice of the plans and tests, an environmental assessment is prepared for my approval to identify any environmental effects and also to determine the need for an environmental impact statement. A public hearing may also be necessary.

Only after these procedures have been followed and I have found no outstanding objections in the public interest may a permit be granted; and then, only after EPA is given another opportunity to comment on the disposal activity and advise that they have no objection.

Copies of the permits are furnished EPA and the U.S. Coast Guard. Applicants are required to advise the Corps of Engineers and the U.S. Coast Guard of the dumping operation 2 hours prior to their departure from the dredged site.

Contractors performing dredging of Federal channels for the Corps of Engineers, likewise report to the U.S. Coast Guard prior to disposal activities.

We look to NOAA and the Corps of Engineers' dredge material research program to provide us with the impacts of our dredge material disposal activities on the environment.

Thus far, NOAA has advised us that only measurable environmental impact to date associated with the disposal of dredged material in the New York Bight has been the accumulation of "a 30-foot mound of dredged spoil . . . over a 33-year period."

Recent studies have indicated that most of the dredged material dumped at the disposal site can be accounted for based upon estimates of quantities dumped since 1936.



In a letter dated March 14, 1975, NOAA concluded that the existing dredged material dump site should not be moved unless navigation is hampered, it becomes a threat to human health, causes extensive damage to the marine organisms, or threatens the safety of beaches.

NOAA stated that current evidence shows none of these conditions exist. Further, through its research program, NOAA has, in effect, been monitoring the New York Bight using a grid pattern for successive surveys.

Ag. General Kenneth E. McIntyre stated to this subcommittee on February 27, 1976, the corps' primary thrust in ocean dumping research is contained in the dredged material research program, DMRP.

My staff is kept informed of the ongoing activities by the Waterways Experiment Station and have actively participated in the Dredged Material Research Program with Dr. Engler and his staff. Findings made in connection with the DMRP program are forwarded in reports to the district for our use.

In summary, the decision to discontinue use of the New York Bight for the disposal of dredge material is most significant. The impacts are far reaching. We are not aware of any scientific evidence which leads us to conclude that disposal of dredge material in New York Bight has significant adverse effects on the marine environment.

Research is under way to answer questions on the effect of dredge material disposal at sea. Preliminary information does not show cause for change. However, should research efforts reveal a need to change our disposal practices, we will be prepared with our analysis of alternatives and indepth work, on the more promising ones.

Mr. Chairman, this completes my testimony.

Mr. MURPHY. Thank you, Colonel.

Colonel Hunter, I did not see in your statement the number of permits requested for ocean dumping, and the number of permits that were denied.

Colonel HUNTER. I will ask Mr. Zammit to respond.

Mr. ZAMMIT. We approximately had, I think, 14 still pending while 17 were issued during the 1975 fiscal year. There were none denied regarding ocean dumping.

Mr. MURPHY. Was there any determination made as to whether or not the material to be dumped was contaminated?

Mr. ZAMMIT. In accordance with the EPA criteria, there was a determination made; yes. It was considered polluted.

Mr. MURPHY. Have you ever turned down a permit?

Mr. ZAMMIT. No, sir. We have not turned down a permit regarding ocean dumping.

Colonel HUNTER. Other permits have been denied, but none involving dumping in the New York Bight.

Mr. MURPHY. I am familiar with the denial of other permits.

Colonel HUNTER. Yes, sir.

Mr. MURPHY. By demonstrating the need to keep channels open for commerce, you give a strong argument for the continued practice of ocean disposal of dredged material.

You also seem to be making a point that, as long as the volume of dumped material is not too great, the ocean can handle the waste.

What I would like to know is, if every potential ocean dumper were to emphasize the economic benefits of disposal at sea, and were to present arguments as convincing as yours, would not the quantities of waste to be dumped exceed the capability of the ocean to assimilate them?

Colonel HUNTER. Mr. Chairman, as indicated in my statement, for New York Harbor I see disposal to be in an ocean location.

We have one of two choices. That is, to be in the ocean, in a diked area, or in the bight, as we now do it.

Our studies thus far have not produced the areas in which upland disposal can accommodate this quantity of material. There are other areas, small harbors, recreational, and so on, where upland is used; but not for the maintenance of the New York Harbor.

We have been dumping in the New York Bight since shortly after the turn of the century. The initial dump site was closer to Coney Island than the present dump site. It has been moved out as the area has filled in.

I have no reason to believe at this time that there is not adequate capacity within the New York Bight to accommodate the quantity of dredge material that this harbor may produce in the coming years.

Mr. MURPHY. I have heard that as much as 34 percent of the dump material or dredged material is contaminated.

Is that true?

Colonel HUNTER. I am going to ask Dr. Engler to answer that, sir.

Dr. ENGLER. This percent was based on a survey made back in the late 1960's using the earliest criteria used on dredged material, a bulk analysis criteria.

This measured both natural components of the soil material that has eroded into the waterways as well as any contaminant that may be there.

From this criteria it was estimated that about 35 percent dredge material was contaminated. I think that is a very high figure because that criteria was much too restrictive, and did differentiate the natural mineral constituent of any dredge material from any contaminant that may or may not be present.

Mr. MURPHY. Has there ever been dumping in a diked area in the New York region?

Colonel HUNTER. Not to my knowledge, sir.

Mr. MURPHY. You mentioned the dike dumping, though.

Colonel HUNTER. Yes, sir.

Mr. MURPHY. As a containment process.

Colonel HUNTER. Yes, sir.

Mr. MURPHY. What would the cost of diking the New York Bight be to prevent the movement of the bight?

Colonel HUNTER. Sir, I do not think it would be the thing to do; to dike in the New York Bight. We have done some preliminary work looking into a containment area in the area of Hoffman-Swinburne Islands. This preliminary work indicates 10 million cubic

yards annually of containment material for 20 years totaling 200 million cubic yards at prices 2 to 2½ times the present rate that would result in a containment area of some half a billion dollars in cost of construction.

In addition to that, over the period of use it would be necessary to pay for the dredgers to go and pick up the material and take it to the containment area for the disposal.

Right now, the preliminary information indicates about half a billion dollars.

Now, this is an interim solution. I say it is an interim solution because once the containment area is filled, then we need to look for some other place for the disposal of dredge material should this become a reality of life.

That is why, Congressman Murphy, in my statement I indicated it would be necessary to dispose of this dredged material in open-water location. By "open-water location" I mean either in the bight as the present practice or in an open-water location with some sort of a structure around the material to contain it.

Mr. MURPHY. Are there any compensating factors in dumping other than the obvious factors of the economics of keeping a port open, making it attractive for large ships?

Colonel HUNTER. By that do you mean dumping in the bight?

Mr. MURPHY. Ocean dumping.

Colonel HUNTER. I am going to ask Dr. Engler to address that.

I have heard some pluses as opposed to minuses.

Dr. ENGLER. You mean compensating factors, has it ever improved the environment?

Mr. MURPHY. I do not mean has it ever given the bottom a little class.

Dr. ENGLER. I think you have to consider what you have been dumping, when dumping dredged material. For the most part it is the soil material that is eroded from farmlands, watersheds, and bank erosion.

Where you have sewage discharge in the waterway, you certainly have containment of dredged material. Release of containments from this material does not seem to be apparent. We cannot find it. I can find no documentation of it.

A site within Long Island Sound has become a rather attractive lobster fishery. It is half a mile from a spawning ground where the lobsters spawn. This is a historical dump site that is not currently in use. I hate to say the area was improved because of that, but it certainly was not degraded into a dead sea or this sort of thing.

It is anticipated in an area in southern Mississippi that a back-water area that has become stagnant just due to natural conditions in the bottom fine grain sediments and it is believed by disposing of sandy dredged material in this area you create a better soil or sediment structure.

On a site specific case, yes, you could have a beneficial effect, but that is very site specific. I think each dump site would have to be handled in that fashion.

Marshes can be created with dredge material. It has been done. Islands can be created. Wildlife habitat can be created by dredged

material and has been done and is being researched quite thoroughly in our program. This is a beneficial use. But this is more near shore than ocean dumping.

Mr. MURPHY. But generally it involves clean fill or clean dredge spoil?

Dr. ENGLER. No, sir.

The marshes do not grow very well on clean sand. It requires a good fine grain, fertil clay like the Mississippi River alluvial soils of which some are fine grained clay with material organic loadings of 1, 2 or 3 percent, giving a nutrient capacity for an emerging marsh.

In many sandy areas where the sandy dredged material has been disposed of you end up with a barren area. Almost nothing grows there.

We are conducting research where sand disposal areas are, top dressing with fine dredged material in a semiagricultural-type application, to create a wildlife habitat. In this case, an upland. It is not a marsh situation.

The fine-grained dredged materials, besides being a sink for contaminants, are also a source of ammonia or nitrate, depending upon the conditions, which are plant nutrients.

Mr. MURPHY. There is plenty of that Mississippi alluvial soil going down. I was talking to the regional corps director down there last summer and he explained the serious problem he has with it.

Counsel?

Mr. SPENSLEY. I have one question, Mr. Chairman.

General McIntyre appeared before us in Washington. I asked one question of him that I would ask of you. That is:

My understanding of the ocean dumping criteria is that it requires that dredge material be classified as either polluted or unpolluted.

Have you been doing that in your district since 1970 or 1971?

Colonel HUNTER. The answer is yes.

Mr. SPENSLEY. For all permits that are issued for dumping of dredge materials?

Col. HUNTER. Yes.

Mr. SPENSLEY. Is that your responsibility then for doing that classification?

Mr. ZAMMIT. EPA develops the criteria and we get the information, and, you may notice in our public notices regarding the actual findings whether material is classified as polluted or not polluted.

Mr. SPENSLEY. It requires testing; does it not?

Col. HUNTER. We get the test report. We apply the EPA criteria and then the public notice so reflects whether the material is polluted or not polluted.

Some of the material we are taking out of Sandy Hook right now is nonpolluted material. It is sand.

Mr. SPENSLEY. Do you differentiate between the conditions put into the permit once you have decided whether it is polluted or non-polluted materials?

Col. HUNTER. Would you elaborate on the question?

Mr. SPENSLEY. Does it make any difference once you classify the materials as either polluted or nonpolluted?

Col. HUNTER. It makes a difference where it can go.

Mr. SPENSLEY. Would you expand on that?

Col. HUNTER. If it is a polluted material it has to go into a site which has been so designated by EPA.

It is unpolluted it does not have to go in such a place.

For example, we are pumping sand on a beach at Sandy Hook. It is a nonpolluted material. That is not a dumpsite that EPA has, designated.

We are dredging in Jones Inlet, on Long Island and pumping sand on the beaches. This is opening up a channel, keeping it open, plus providing a basin in which the littoral drift may deposit as it moves along the Long Island coast.

Mr. SPENSLEY. Is it fair to assume that all the polluted dredged material goes into the New York Bight?

Col. HUNTER. I would say if it is polluted; yes, it does go into the New York Bight. That is not to say that everything that goes there is polluted.

Mr. SPENSLEY. Thank you, Mr. Chairman.

Mr. SMITH. Colonel, on page 4 of your testimony you state that the disposal of 30 million cubic yards of dredged material in the New York Bight would pose no threat to the area; and NOAA has submitted to this committee that the dredged material contributes the major portion of the heavy metal input between 24 and 80 percent, in their estimation, to the Bight area.

Would you agree with these projections of NOAA and, if so, do you still maintain that your dredge material poses no threat to the marine environment?

Col. HUNTER. In my statement I said that we are proposing to deepen the channel, which means that we would go in and dredge from existing channel depth, which is 35 feet, and the proposal is to go down to 45 feet. This is what was surfaced in our recent public hearing.

In going down this extra 10 feet we are going to be digging down in areas where, so far as we know, man has not dug before.

So essentially that is why I say you are getting into material which is essentially virgin material. As such, picking that material up and putting it on some sort of a device, a barge or something, and taking it out to the Bight, one would conclude that it should present no threat to the environment. It is in its condition that nature put it in; although it may have a heavy metal content which by the criteria promulgated by EPA would result in the material being classified as polluted.

Some of what is going to come out of there, incidentally, is rock. We are not sure whether it is going to all go out in the Bight or not.

The people over in that area have asked us to take a look at putting some of that along the banks which we are going to do.

Mr. MURPHY. Bayonne?

Col. HUNTER. Yes.

Mr. MURPHY. Give them Shooters Island while you are at it.

Col. HUNTER. [Jokingly] Sir, I would like to.

Mr. MURPHY. Dr. Engler, Mr. Zammit, did you have something to say?

Dr. ENGLER. I would like to make a comment on the loading you alluded to. It is very misleading to say that 80 percent of a given heavy metal loading is due to sediment material. This is based on a bulk characterization of the sediments, say, a total zinc composition of the sediments, which includes natural zinc, which is in the Earth's crust and any zinc that may be there due to man's contamination.

So, in our studies we are showing that the majority of heavy metals in dredge material is mineralogical in nature, by using a bulk characterization, which is what the criteria was prior to 1973, one gets a gross overestimation of the heavy-metal loading, such as copper, lead, zinc, mercury, and other constituents that do exist naturally in the Earth's crust.

Mr. SMITH. But you do not think the dredged material exceeds those metal levels?

Dr. ENGLER. The old criteria said if dredge material exceeded 50 parts per million zinc, it was considered a pollutant. The Earth's crustal abundance is 80 or 90 parts per million.

Mr. SMITH. How about cadmium?

Dr. ENGLER. Cadmium was not listed on the original criteria. Lead, zinc and mercury, I recall, were the three heavy metals. I do not think there was a numerical limit assigned for dredged material, per se.

Col. HUNTER. I will make, if you so permit, Mr. Chairman, one observation.

What happens to the metals when they get to the dredge disposal site? Are they given up in the water column? Do they stay there?

If they stay within that pile of dredge material in the Bight, you get virtually the same situation you had as if you had them in a containment area. They remain there and are not given up into the water column.

Mr. SPENSLEY. Just one question to follow that.

With respect to the dredged materials that you have tested, can you give me some rough idea in the last 2 or 3 years what proportion of it is considered to be polluted dredged material?

If you do not have the answer, you can submit it for the record.

Mr. HUNTER. I do not have the answer.

Mr. SPENSLEY. You can provide it for the record.

Mr. MURPHY. It can be provided for the record.

[The material referred to follows:]

Since promulgation of EPA's 1973 Ocean Dumping criteria, the New York District has disposed of dredged material from Federal channels totaling 5,330,600 cubic yards in 1974 and 10,413,300 cubic yards in 1975. Of these quantities, approximately 42% of the material in 1974 and 40% of the material in 1975 was polluted. Under permits (not including Federal channel dredging) issued by the New York District, Corps of Engineers, 1,811,100 cubic yards of dredged material was disposed of in 1974 and 2,563,000 cubic yards in 1975. Approximately 66% of this material was polluted in 1974 and 82% in 1975.

It should be noted that the criteria used to determine whether or not dredged material is polluted is the CFR Title 40, Section 227.61, as published in the Federal Register on 15 October 1973, and that this criteria deems an entire project's dredged material to be polluted if it has an excess concentration of even one constituent.

Mr. MURPHY. Colonel, can you give us a figure on the water flow through the New York Bight on a tidal basis?

Colonel HUNTER. No, sir; I cannot. I do not know. I could get it for you, or you may defer that question to NOAA.

Mr. ZAMMIT. The NOAA folks may be better able to answer that.

Mr. MURPHY. Thank you very much, Colonel Hunter. We appreciate it. Mr. Zammit, Dr. Engler, we appreciate your testimony also.

Mr. MURPHY. The next witnesses will appear as a panel. They will be Mr. John P. Mugler, Environmental Quality Program Office, Langley Research Center, National Aeronautics and Space Administration; and Comdr. Lawrence Swanson, MESA New York Bight Project, Environmental Research Laboratories, National Oceanic and Atmospheric Administration.

We will ask Mr. Mugler to proceed first. At the conclusion of Mr. Mugler's testimony, we will ask Commander Swanson to testify; and then we will have a colloquy with the panel.

Mr. Mugler.

**PANEL CONSISTING OF: JOHN P. MUGLER, JR., ENVIRONMENTAL QUALITY PROGRAM OFFICE, LANGLEY RESEARCH CENTER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; JACK CRAMER, NASA OFFICE OF LEGISLATIVE AFFAIRS, WASHINGTON; CMDR. LAWRENCE SWANSON, MESA NEW YORK BIGHT PROJECT, ENVIRONMENTAL RESEARCH LABORATORIES, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION; AND DR. JOELS S. O'CONNER, NOAA**

Mr. MUGLER. Thank you, sir.

I also have with me Mr. Jack Cramer from the NASA Office of Legislative Affairs in our headquarters in Washington.

Mr. MURPHY. He can join you at the witness stand if he wishes.

Mr. MUGLER. Also, I do have some visuals I would like to show.

So if it is agreeable with the panel, I think I would be better to talk from the screen.

Mr. MURPHY. Go right ahead and proceed.

Mr. Swanson, would you identify who is with you?

Mr. SWANSON. Dr. Joel S. O'Conner.

Mr. MURPHY. He is from NOAA also?

Mr. SWANSON. That is correct.

[Slide No. 1]

Mr. MUGLER. One of the goals of NASA's application program is the development of remote sensing technology for monitoring air and water pollution.

Now, as you know, we focus our attention strongly on satellite systems, but the same technology development program that gives us the remote sensing systems for satellites also provides the systems useful on aircraft and on the surface.

In addition, to make maximum use of the satellite information, we often have to obtain measurements from aircraft and the surface to give us a data base for analysis and interpretation.

NASA has a number of cooperative programs with State and Federal agencies which have statutory responsibility in monitoring; and in those programs we attempt to apply this technology to meet specific monitoring needs.

In compliance with your request, we have summarized the activities which we are conducting in the New York Bight. I have in my prepared statement a short summary. In my comments here I would like to elaborate on a few of those. I will not touch on all of them because of the limitation of time here today.

Before I get into that, first let me specifically answer the five questions that the subcommittee included in the request to NASA. The first question is:

What photographs have you taken with various types of film and from different altitudes of the New York Bight?

As I mentioned earlier today, we have been working cooperatively with NOAA and EPA since 1973 and, during that time we have made a small number of overflights of the Bight. We have taken quite a few photographs, literally thousands of photographs; but I want to emphasize that in overflight operations you frequently gang cameras together and take photographic sequences, once a second. So the number of photographs accumulates quite rapidly.

These photographs were taken in black and white, color and on infrared film, and from altitudes ranging from a few thousand feet to 65,000 feet.

But I want to emphasize a point here. Photography is not the data product that we in NASA are really looking for. There is a much more powerful technique, in our opinion, for monitoring pollutants, and that is called a multispectral scanner.

[Slide. No. 2]

Mr. MULGER. This is an instrument we have on the satellite and, although the products do appear as photographs, they are really images that are constituted from a device called a multispectral scanner. The scanner is similar to a camera in that it does sense the upwelling radiation from the surface. However, once that radiation gets inside the instrument, it is treated substantially different than in a camera.

Rather than being recorded on a photographic emulsion it is broken down into its spectral components and the radiance of each wavelength is then detected individually.

In this particular instrument there are eight separate detectors. We would call this an eight-channel multispectral scanner.

On the landsat satellite the scanner happens to be a four-channel scanner. Once the signal is detected it is amplified electronically and also converted electronically into digital data. The digital data is then broadcast to a ground station if the satellite is within range of a ground station.

If not, it is stored on magnetic tape and then commanded to be broadcast when we come within range.

If we are flying on an aircraft we can also have a real time monitor to look at what is going on or, if need be, we can record it on film.

The point I want to make here is the data that we get from a multispectral scanner can give us substantially more information about specific pollutants than conventional photography; and I will be giving examples of this as I go on in my discussion here today.

The important point is that we get digital data. And from the digital data we can get much more detailed information than is



available from conventional film. The primary data is the radiance at the different wavelengths. Once we get that digital data we can then put it into a computer system so we can computer enhance the images to better show the pollutants that we are trying to sense.

I will have some examples of computer enhanced imagery. In fact, there are some on the boards displayed there, and I will be pointing out which is photography and which is computer-enhanced imagery, so you can compare the two.

The second question is: What can be determined from these photographs?

We contend that at this point in our research programs, we can distinguish between major pollutants and determine the surface extent of those major pollutants. The focus of the program right now is to determine how well we can quantify those pollutants. That is, to determine their surface concentration.

Do you work in cooperation with the Environmental Protection Agency in this area?

The answer is yes, and we will give examples; and my statement contains examples of that.

How long have you been taking these photographs of the New York Bight?

Can you determine any changes over time?

As I mentioned earlier, we started in 1973. However, we have had only a small number of field exercises where we have taken imagery and that does not constitute a sufficient data base to determine changes over time.

I think the more important thing is that using these techniques we, in conjunction with NOAA and EPA, are trying to ascertain the capability, the accuracy and limitations of these techniques to monitor ocean dumping. Once that is determined, then I think it might be appropriate to use them in a more systematic way to reduce changes in the situation in the bight.

Has the Environmental Protection Agency asked that you continue this aerial monitoring?

Yes; they have; and there are comments about that in my written statement.

OK.

In the remainder of my comments, then, I would like to highlight certain aspects of our cooperative activities.

Could I have the next slide?

[Slide. No. 3]

Mr. MUGLER. I mentioned we have cooperative activities with NOAA and these focus primarily on the marine ecosystems analysis program, MESA, and we have cooperative activities with EPA, both the Office of Research and Development in Headquarters and EPA Region II.

First I would like to highlight some work we are doing with NOAA.

[Slide. No. 4]

Mr. MUGLER. Our objectives in this work is to investigate the role of remote sensing to measure such features as circulation, ocean dumping, and baseline data, which includes other things, like chloro-

phyll, temperature, salinity, things of this nature, that you would need for an environmental impact statement; and if the potential of remote sensors is, in fact, realized, then we would assist NOAA with the design of a monitoring system that incorporates these remote techniques.

[Slide. No. 5]

Mr. MUGLER. We started in 1973, as I have already mentioned. We had just launched what was then the ERTS-1 satellite, which is now Landsat-1, in the summer of 1972.

In 1973, we had clear weather over the bight and this slide shows very clearly that we could detect strong surface features, like the acid dumps. The fainter features that you see on both sides of the bright acid feature are drifting acid. The stronger feature is a recent acid dump. You could also detect the sediment plume coming out of the Hudson.

In this joint field experiment in April 1973 with NOAA, NOAA provided ground truth, and NASA did the overhead monitoring.

In addition to satellite imagery, we flew scanners on aircraft, and one of these was called the multichannel ocean color sensor.

[Slide. No. 6]

Mr. MUGLER. The sensor itself is about 2 feet long and it weighs about 23 pounds. It was installed in the NASA C-54 aircraft, which operated out of the Wallops Flight Center located on the eastern shore of Virginia. It overflew the bight and covered the same acid dump feature that you saw on the satellite imagery.

[Slide. No. 7]

Mr. MUGLER. This sensor gave us much more detailed information about that acid dump. This image is called a false color map. To develop a false color map with the computer, we can assign a given color to a concentration of the specific pollutant. In this case we assigned red to the highest concentrations of acid in the center, and then assigned other colors to the varying concentrations going out to the blues, which were 60 to 65 percent of the highest concentration.

With images such as this, then, coupled with the satellite imagery in 1973, we demonstrated that, one, we could see strong features on the surface from several major pollutants and, two, that we could get some qualitative information about the concentrations.

This encouraged both NASA and NOAA quite a bit, and we determined that we should go ahead with more extensive programs [slide No. 8].

Mr. MUGLER. Collectively, we planned a second program which took place in April of 1975.

This is the experiments list. I am not going to go through it, but I just wanted to show you that it is substantially more extensive than the original one, based on the potential shown in our earlier investigations.

I did want to highlight the results from two scanners listed here to show you the type of information that came out of this field experiment.

The first one is the ocean color scanner. This is a prototype instrument of the coastal zone color scanner which is to be flown on the Nimbus G satellite in 1978.

I will also show some additional data on the multichannel ocean color sensor, which was flown in 1973. This was a more advanced version of that sensor, looking at other substances besides acid. So first let us look at the ocean color scanner [slide. No. 9].

Mr. MUGLER. The instrument looks like this. It is about 21½ feet long and weighs about 30 pounds. It is mounted on the U-2 aircraft, which flies at about 65,000 feet [slide. No. 10].

Mr. MUGLER. The type of imagery that comes from this scanner is shown here. This image covers an area on the surface about 20 miles wide, and 70 to 80 miles long. This is computer-enhanced imagery. This is not a photograph. I want to make a particular point of this, because very often when we look at these images they look an awful lot like photographs, and you tend to think they are photographs. This image has been reconstituted from digital data taken from the multispectral scanner.

With the ground truth that was given to us by NOAA and EPA, coupled with spectral information about the particular pollutants involved, we can tell the computer, for example, to go in and find everything that has the same spectral characteristics as acid, and color it yellow, when it does this, you can see that it enhances this particular feature to the point that it almost hits you in the face. Similarly, with sewage sludge. Similarly with sediment coming out of the Hudson River [slide. No. 6].

Mr. MUGLER. Now, looking at the other data from the multichannel ocean color sensor [slide. No. 11].

Mr. MUGLER. We did a similar thing with chlorophyll and acid.

One of the flight lines in the April 1975 experiment came right over the acid dump site and continued over the tip of Sandy Hook onto Staten Island. We had detected acid in 1973, and we were able to do a similar thing with acid as we did before. However, we did get more extensive ground truth here, so we could do more quantification.

This image also shows we were able to detect chlorophyll concentration. In this particular case red has been assigned to chlorophyll concentrations of approximately 25 micrograms per liter. Blue is less than 15 micrograms per liter.

You can see moving along this flight line from out in the bight to Staten Island, we see increases in chlorophyll up to 25 micrograms per liter, and then the maintenance of rather high chlorophyll concentrations between Sandy Hook and Staten Island. This is an indication of the high nutrient load found in this portion of the harbor [slide. No. 12].

Mr. MUGLER. Before we go into that slide, let me digress here for just a moment. What we have heard about so far has to do with mapping surface pollutants. In addition, NOAA is interested in bottom water movement. I will talk now about a program that we have done with NOAA to measure bottom water movement.

This little thing that looks like a bullet [displaying a metal object] is an acoustic pinger. It is a device that gives out an acoustic signal roughly once a second. In the early days of NASA when we launched nose cones from our Wallops Flight Center and Kennedy Space Center, the nose cones would impact in the ocean, and very

often we would want to find them to make additional studies of what took place during the reentry.

We lost a few of them, and after a while we decided if we put a device like this in the nose cone in the payload, even though it was on the bottom of the ocean we could track it and find it. Well, we applied this technology to measure bottom water movements. We put an acoustic pinger on a seabed drifter.

Now, the conventional seabed drifter looks like this [displaying a seabed drifter]. I assume most people here are familiar with the conventional seabed drifter. It falls to the bottom. The canopy provides buoyancy, so it moves along the bottom with the currents. There is a serial number on each one. If you know where you deployed it, and you ask whoever finds it to send the post card to tell you where and when they found it, you can get a first order estimate of the strength of the bottom current that was necessary to transport the seabed drifter from point A to point B.

However, there are still a lot of questions because the drifter could take various paths between points A and B, and the currents could change in magnitude and direction, also. Of course, in this case you also depend on the drifter being found rather promptly.

Well, to get additional information using the seabed drifter, we replaced the buoyancy weight with the little acoustic pinger, and using a listening device on a ship we can then track the seabed drifter along the bottom and get real time information about the bottom currents.

At the request of NOAA we used a group of these seabed drifters with the pingers attached, and this slide shows how they were deployed in clusters of six, to give us some reasonable statistics. This particular field exercise was done in November 1975.

Well, after they were deployed, NOAA ships and equipment tracked them in the night. Some of the results of this experiment are shown on the next slide [slide No. 13].

Mr. MUGLER. We deployed two groups in the vicinity of the sewage sludge dump site; actually between dump site and the Long Island shore. We tracked them for roughly 6 days. The results indicated bottom currents between about one-tenth and two-tenths nautical miles per day. This information has been furnished to NOAA.

From our point of view, we think this experiment demonstrated a way to determine bottom water movement in a rather cheap, but effective way.

[Slide. No. 13]

Mr. MUGLER. There are other examples of cooperative activities with NOAA in the statement that I have not had time to cover. But now I want to talk a few minutes about cooperative activities that we have done with EPA.

The Office of Research and Development has asked us to evaluate a group of remote sensors to measure pollution parameters in both estuaries and coastal waters. This cooperative interagency agreement has been underway for about 3 years, and during that time we have evaluated roughly a dozen different types of instruments.

This picture composite shows five of them to illustrate the different types.

[Slide. No. 14]

Mr. MUGLER. This is an example of how cameras are very often used, ganged together in groups of four and six, with different types of film and filter combinations, multispectral scanners, which I have already talked about, microwave techniques, which right now are very useful for temperature and salinity measurements, but which also have the potential for doing nighttime monitoring, which has come up in this discussion earlier.

The microwave techniques are still in the research phase, and the extent to which we can monitor the pollutants at night has not yet been determined, but I think the potential is definitely there.

This slide also shows a specialized radiometer designed primarily for chlorophyll detection. These are the types of instruments we have evaluated for the Office of Research and Development in EPA.

Some of these instruments are useful for monitoring ocean dumping, and in cooperation with EPA Headquarters and EPA Region III, we have been engaged in a field exercise off the coast of Delaware.

Next slide.

[Slide. No. 15]

Mr. MUGLER. We overflow the acid dump site about 40 miles off the coast of Delaware, and we also overflow an industrial effluent up the Delaware Bay.

These data are being used in conjunction with the earlier data I discussed from the New York Bight. It gives us additional information about a different type of acid dump in somewhat different waters, water with different sediment loading.

So these data are being used in our analysis along with data from the New York Bight.

[Slide.]

Mr. MUGLER. Next I want to discuss our work with EPA Region II. In the life support systems development that we conducted in NASA several years ago, We determined that a different technique for coliform bacteria detection was necessary.

As you realize, coliform is a primary indicator of sanitary water quality, and in a closed life support system we had to have a continuous measure of sanitary water quality, because these are closed systems in which water was reused.

As part of that program we developed a new technique for coliform detection, which is more rapid than the standard techniques, and also can be automated.

The instrument itself looks something like this. There are test cells which contain a nutrient broth. A water sample is brought into the test cells. If it contains coliform, the coliform bacteria will begin to multiply, and in that process they will release hydrogen gas.

The hydrogen gas is detected electrochemically. When it reaches a certain threshold you can determine what the initial concentration of coliform bacteria was.

These instruments can be used at the surface or at the bottom, or between the bottom and the surface. The particular application we are looking at in conjunction with Region II, is to put them on the bottom at first. It is very important to recognize that this process

can be automated, and a command from some central ground station to a given monitor can tell the monitor to take a sample, and report what the coliform level is.

The automated process begins when we ask a monitor to take a measurement. Once the result is determined, it is sent back up the hard wire to an antenna and transmitted to the command station.

So you can get a coliform measurement remotely without having to go out in the boat, take a sample, bring it back to the laboratory and wait tens of hours for this analysis.

I understand that Region II is interested in this monitor to place it between the dump sites and the recreational areas, in hopes of giving an early warning of possible coliform intrusion.

The hardware itself looks like this.

[Slide No. 17]

Mr. MUGLER. The hardware weighs about 800 pounds. The top has been taken off here to show some of the sampling piping.

These ports around the outside are sample ports where the water sample is drawn into the test cell.

Incidentally, the bottom part here is full of batteries and other electronics that are necessary for the system.

Once the sample is drawn in, the procedure for determining the coliform level is actuated.

Let me have the other slide again.

[Slide No. 16]

Mr. MUGLER. Once you get the information, then as I mentioned, you can send it up the hard wire to the transmitting beacon back to the commandstation.

In addition to coliform detection, EPA Region II has been very interested in the use of remote sensors as a possible addition to ocean dumping monitoring systems, and the last slide indicates some of the imagery that we have been furnishing them.

[Slide No. 18]

Mr. MUGLER. The imagery on the right is the same imagery that you saw earlier.

However, here I have it next to conventional photographic coverage of the same area. Both of these images were taken at the same time.

In other words, the scanner and the cameras were both mounted on the aircraft. Both images were taken simultaneously from U-2 aircraft at 65,000 feet.

I want to make the point here that if you get up close and examine the original photograph you can see only faint evidence of a sewage sludge dump and of an acid dump. You do not see much evidence of sedimentation along the New Jersey shore.

With the multispectral scanner data, by using the unique spectral features of the sediment acid and sewage sludge and computer enhancements we can see these features very easily.

This completes the highlights that I wanted to give, but I do want to emphasize that there are additional activities in the statement that I have not covered here today.

Mr. MURPHY. Commander Swanson.

Commander SWANSON. We have some slides which will be shown as I give my testimony, if we have time, Mr. Chairman.

Mr. MURPHY. You may proceed.

Commander SWANSON. While he is setting up the projector, I might make a few comments on the core that you have in front of you.

As you noted earlier in the day, that particular core comes from about  $2\frac{1}{2}$  miles to the north and west of the sewage sludge dump site. It is mostly clean sand in the upper portion of the core. The lower portion has dark organic material, probably material that is both natural, probably has some sewage sludge, some from the dredge spoil site, and naturally occurring organic material that occurs in the Bight due to death of phytoplankton and what have you.

We do not know what the chemical constituency of that particular core is.

However, in gross appearance it is probably not too much different from what you would find if you had a core taken from as long ago as 1845 or before man started to dump there. It is representative of a topographic low in which foreign materials do accumulate naturally. The sand that is on top of it is a consequence of probably a storm event that has moved the coarser material in this case on top of the fine material that you see in the bottom of the core.

That is just a little history.

We appreciate the opportunity of speaking before you today, Mr. Chairman.

The area encompassed by the MESA project is bounded by the edge of the Continental Shelf, and by the Long Island and New Jersey coasts. The apex of the Bight is the area where New York Harbor meets the coastal waters, and where most ocean dumping occurs in the Bight.

Environmental scientists understand the interactions between human civilization and the marine environment in only a general way.

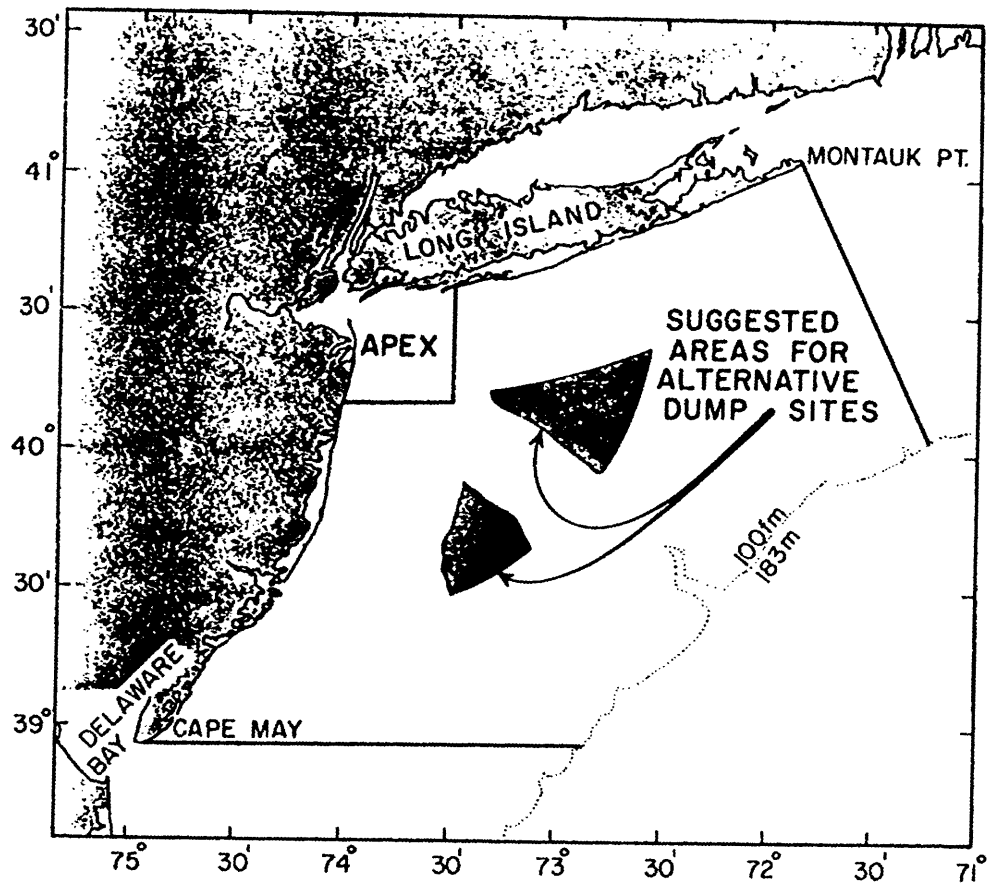
It is obvious, for example, that some 20 million people, great cities, and large industries which border the Bight impact its coastal environment and ocean waters. But it is not at all obvious whether this impact is totally adverse, or how much use can be accommodated by the New York Bight without damaging it more than is tolerable. We know it has been heavily impacted.

However, we have only limited information about the specific causes of these impacts on the recuperative powers of the Bight and its marine life.

I would like to emphasize that the New York Bight is not the Dead Sea. That is a complete misnomer.

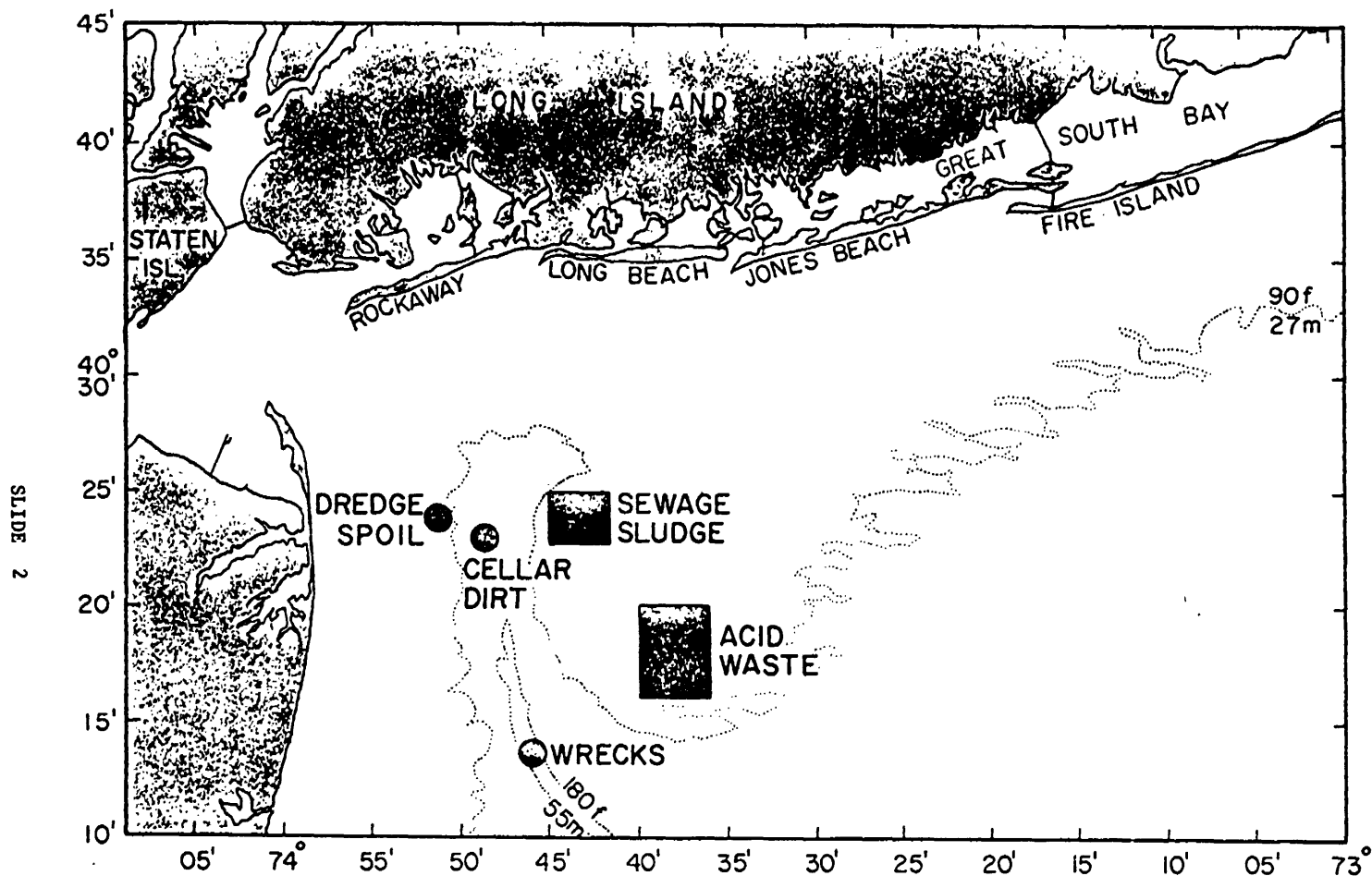
Again, we agree with you, it is heavily impacted, but it is not at all a dead sea.

We are studying the characteristics of material disposed at specific dump sites in the Bight, the movement and dispersion rates of dumped materials, and the long- and short-term chemical, biological, and geophysical interactions which govern the fate and effects of such dumping.



SLIDE 1





NEW YORK BIGHT APEX DUMP SITES

To date, most of our field activities have been concentrated in the 625 square-mile rectangular area we call the apex. It is there that ocean dumping, particularly of sewage sludge is, without doubt, the most visible and probably the most esthetically displeasing activity contributing to the overall Bight contamination problem.

The press and legislative bodies of State and Federal Government have urged the elimination of ocean dumping of sewage sludge. This admirable aim should be reached in the context of management practices that provide the greatest relief to the Bight marine environment within economic and technological constraints that are available to us.

For the past 21½ years, our scientific efforts have been directed almost exclusively toward ascertaining the effects of existing ocean dumping practices, and investigating the ecosystem in and around two proposed alternative ocean dumping sites, located approximately 65 nautical miles from the Long Island and New Jersey coasts. This work was conducted to provide scientific information to EPA for use in management decisions about the dumping of sewage sludge in the Bight.

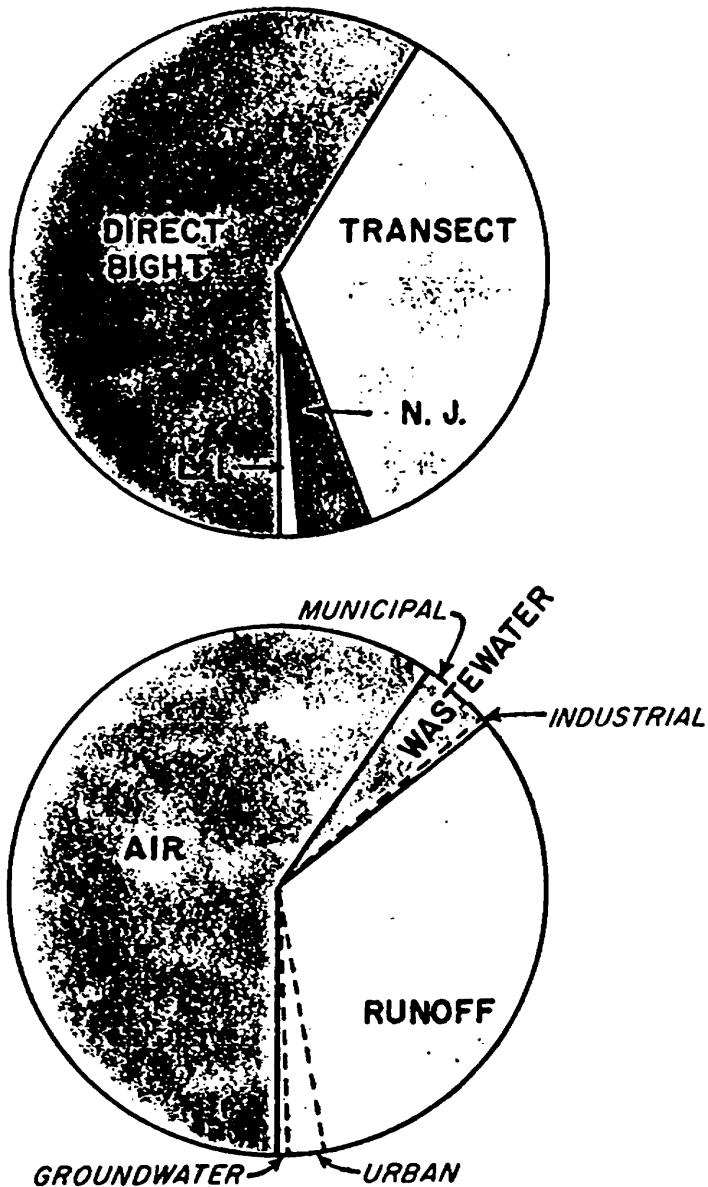
My summary will concentrate on our studies of the importance of sewage sludge dumping, compared to other contaminant loads in the Bight, and the fate and effects of sewage sludge dumping.

Materials dumped in the Bight include sewage sludge, dredge spoil, acid wastes, and chemical wastes. The quantities of these dumped materials are impressive.

However, such numbers tell us little about the individual contaminants associated with each dumping activity. More importantly, how do the dumping activities compare to the other contaminant sources in the area, such as atmospheric fallout, waste water, and runoff?

In order to help assess this issue, the MESA New York Bight project sponsored a recently completed investigation which identified the sources and magnitudes of contaminant inputs into the Bight. Some conclusions from the study are:

## FLOW

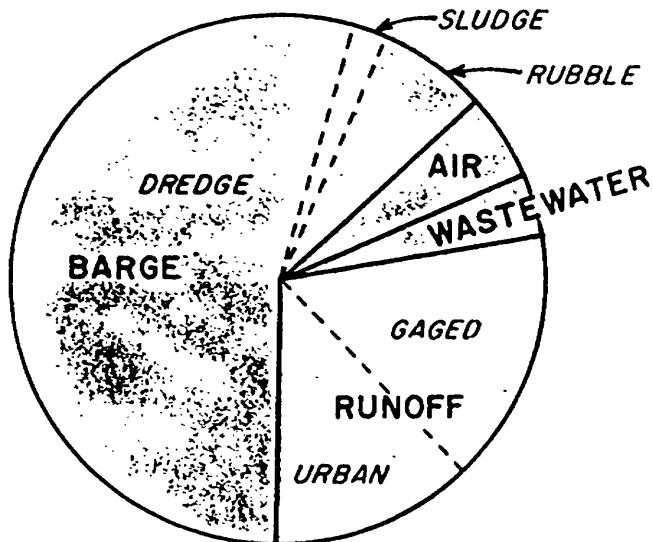


DISTRIBUTION OF FLOW INPUTS TO THE NEW YORK BIGHT BY LOCATION AND ORIGIN. SOURCE: MUELLER AND JERIS.

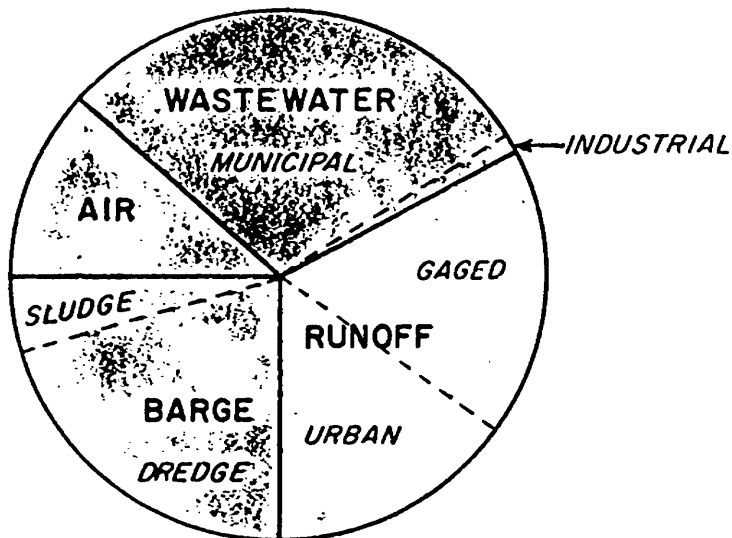
SLIDE 3

1. Sewage sludge dumping contributes less than 6 percent of the heavy metal input into the Bight. Dredge material contributes the major portion of the heavy metal input, 24 to 80 percent, with the

exception of mercury. The metals considered were cadmium, chromium, copper, iron, mercury, lead, and zinc. [Seventy percent of the mercury is attributed to waste water.]



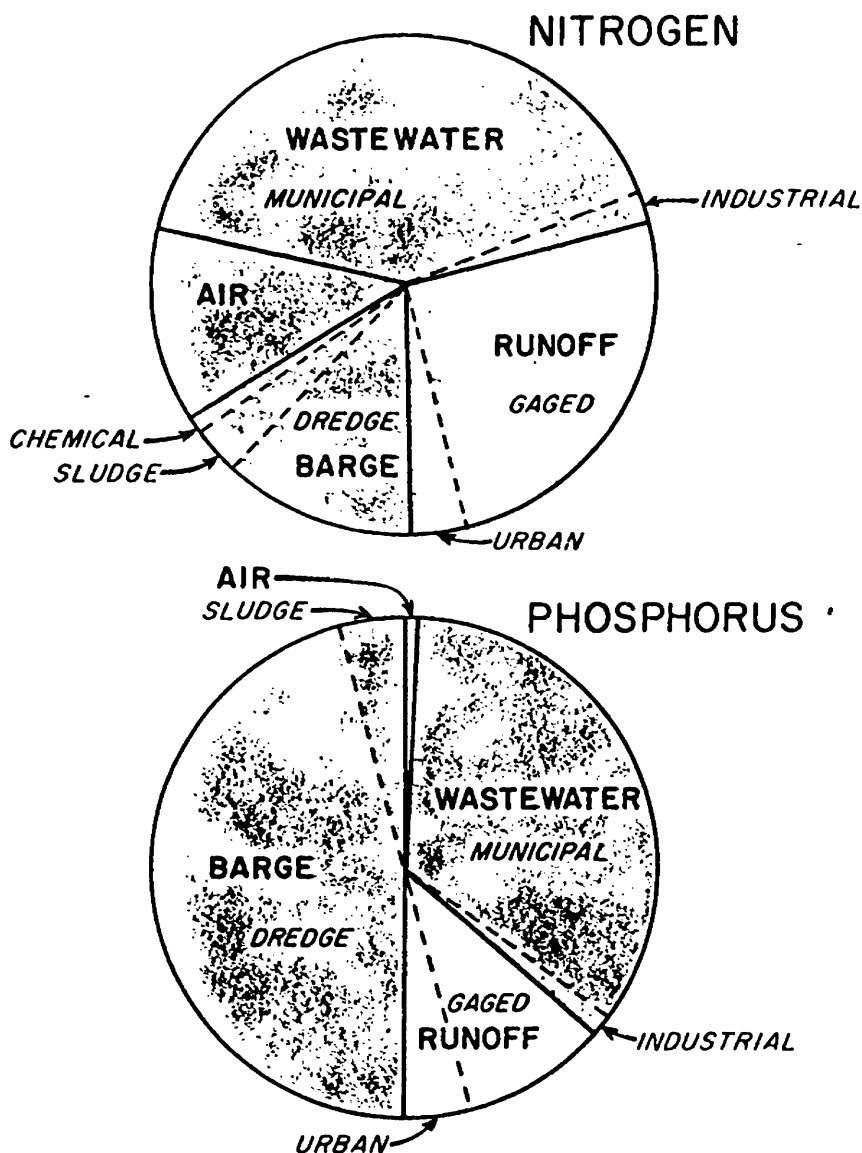
SUSPENDED SOLIDS



ORGANIC CARBON

DISTRIBUTION, BY ORIGIN, OF NEW YORK BIGHT SUSPENDED SOLIDS AND ORGANIC CARBON LOADS. SOURCE: MUELLER AND JERIS.

2. Organic carbon comes primarily from waste water, dredge material and gaged and urban runoff.

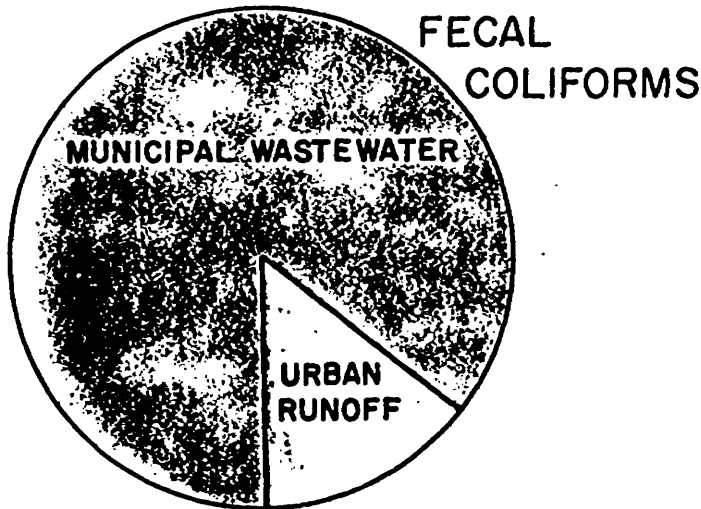
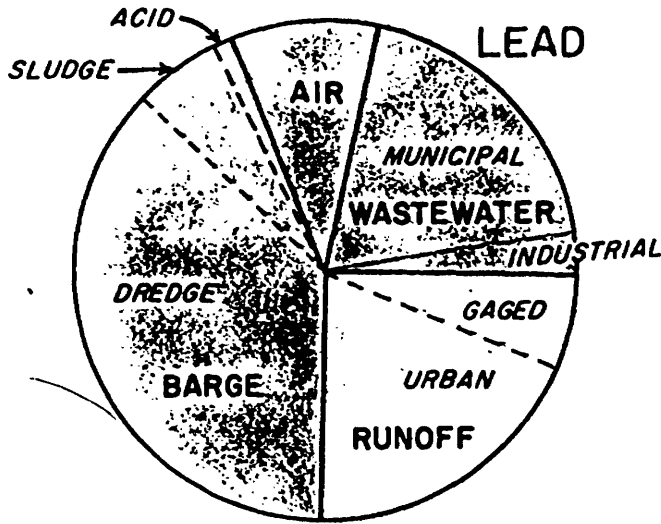


DISTRIBUTION, BY ORIGIN, OF NEW YORK BIGHT NITROGEN AND PHOSPHORUS LOADS.  
SOURCE: MUELLER AND JERIS.

SLIDE 5

3. Municipal waste water and gaged runoff contribute 65 percent of the nitrogen to the Bight, while dredge material and atmospheric fallout contribute most of the rest.

4. Municipal waste water and dredge material account for 80 percent of the phosphorus in the Bight.



DISTRIBUTION, BY ORIGIN, OF NEW YORK  
BIGHT LEAD AND FECAL COLIFORM LOADS.  
SOURCE: MUELLER AND JERIS.

SLIDE 6

5. Unchlorinated municipal waste water and urban runoff from combined sewer overflows contribute the bulk of the fecal coliform bacteria.

The composition of sewage sludge, a product resulting from the treatment of waste water, varies with sources and treatment plant. In general, it is about 5 percent solids and 95 percent liquid. In

1974, some 3.7 million cubic meters of this material were dumped in the apex of the Bight.

Where does it go? When sludge is dumped, the mixture disperses, some of it is swept laterally by Bight currents and some of it sinks toward the sea floor. A small portion may float, and individual constituents may dissolve or remain suspended in the water column.

Based on sediment samples, we know that the portions of sewage sludge which sink to the bottom have not formed a massive lens of material at or anywhere near the dump site. In fact, the bottom depths at and near the dump site are essentially the same as they were in 1936.

Generally, however, the sea floor near the sewage sludge dump site is an admixture of natural fine sands, natural muds of high organic content, and sewage sludge materials in different stages of degradation. The surface layers of samples taken at the sewage sludge dump site generally have a consistency which ranges from sand to black organic material. An appreciable amount of sludge material extends beyond the sewage dump site in all directions, but primarily to the north into a topographic low, called the Christiaensen Basin.

The concentration of sewage sludge materials in the Christiaensen Basin may be caused by short dumping or by deposition of transported or resuspended sewage sludge in the water column. The bottom of the Christiaensen Basin is essentially covered with a mixture of muds rich in organic matter (1) transported into the area from the Hudson Estuary; (2) produced in the area by marine organisms, primarily plankton; and (3) dumped as sewage sludge and dredge spoil and transported into the area by the quasi-estuarine, gyral circulation system found in the inner Bight.

The New York Bight is marked by a characteristic near-shore flow in which bottom water moves toward the beach. Natural hydraulic processes related to this circulation permit suspended materials to be deposited on the bottom. The mud deposits formed in this way, in depths of less than 20 meters, are a common occurrence along the Atlantic coast, usually forming patches in small topographic lows. Such natural mud patches have been shown on charts dating back to 1845.

In the nearshore zone these organic rich mud patches tend to be small in extent, usually less than 10 meters in diameter, and less than 15 centimeters thick, which together covered less than 10 percent of the bottom. Most of these mud patches are probably removed by the strong wave action associated with winter storms. Some of our studies have shown sediment movement of at least 1,200 meters associated with a single winter storm lasting only 2½ days.

Continental shelf floor muds, invariably rich in organic matter, tend to group finely divided inorganic particles and organic matter as a result of hydraulic sorting processes. Clays also occur commonly and characteristically contain about 5 percent by weight of iron oxide, which usually veneers a shelf floor mud with a thin, reddish-brown layer.

Depletion of oxygen by decaying organic matter several millimeters below the bottom surface has its effects on these muds, producing a dark, sometimes black color. This type of material can be found along virtually deserted as well as heavily populated stretches

of the Atlantic coast. Thus, gross color and texture of mud patches near the Long Island coast are no guides as to whether or not they contain sewage sludge.

Analysis of these muds for their natural and man-related constituents is not a straightforward procedure. Sewage sludge produced by one treatment plant differs in composition from that produced by another, and even material produced at one treatment plant may vary greatly over time.

Once dumped, the material is acted on by decomposition, interactions with various components of the marine biota, reaction with inorganic portions of the environment, and dilution due to mixing with the water and sediment.

A simple test or two does not differentiate transported or migrated portions of sewage sludge from natural organic material, raw sewage emanating from rivers, harbors, outfalls, and passing vessels, or from sewage sludge which is dumped short of the existing dump site.

At best, a series of tests on a sample containing "sludge-like materials" could exclude one or more sources, but not all possible ones.

The New York area sewage treatment plants also receive large quantities of heavy metals from both domestic and industrial sources. Since some of these metals are present in the dumped sewage sludge, attempts have been made to identify sediments contaminated with sewage sludge by measuring their heavy metal content.

However, as indicated above, the single largest source of metals is from dredge spoils, and other nondumping sources are also very significant. Thus, it does not seem likely that the metal concentrations of sediments, no matter how they are expressed, will by themselves provide useful indications of where sewage sludge settles to the bottom.

Similarly, total organic carbon is not a suitable indicator of sewage sludge material because in an area such as the New York Bight, marine plants produce more than twice as much organic matter than is dumped in the form of sewage sludge.

A fraction of organic matter, such as carbohydrates which include cellulose, has provided a crude means of differentiating muds. The ratio of carbohydrates to total organic carbon allows the separation of natural organic materials and sewage-derived materials. Again, however, differentiation of sewage sludge and other sewage sources is not possible with this technique.

Analysis of sediment samples shows that the highest total organic carbon values of about 3 percent by dry weight occurs in the Christiaensen Basin, a few miles north and west of the sewage sludge dump site. This is about 10 times less total organic content than is found directly in sewage sludge. High total organic content and also high carbohydrate concentrations occur all along the Hudson Shelf Valley.

Mud samples from within 1 mile of Long Island beaches show relatively high carbohydrate content, as a percentage of total organic carbon, indicating that some of this mud may be derived from one or more sewage sources—raw sewage from the harbor, from ships, from outfalls, or from sewage sludge.



On the other hand, sediment samples from Rockaway Inlet and Jones Inlet show rather less carbohydrate content, indicating mainly a natural origin.

Dredge spoil has accumulated at its designated apex dumping site some 30 feet over the past 30 or so years. This is a result of the dredge material being sand, for the most part, and hence, rapidly settling to the bottom. Some 80 percent of the amount dumped can be accounted for in the radically changed relief.

However, much of the contaminated material in dredge spoil, such as organic materials and metals, is associated with the lighter fractions. The lighter fractions do not settle as rapidly and, hence, are subject to transport over much wider areas of the apex. This dispersal contributes to the higher metal and organic matter concentrations of the Christiaensen Basin sediments. The relative magnitude of contributions from dredge spoil and sewage sludge is uncertain.

As part of its activity the MESA New York Bight project has tried to identify specifically the impact of sewage sludge dumping on the marine environment and the biota.

The complex cycling of carbon, nutrients, and oxygen seems to support the observations of high nutrient loading, high phytoplankton productivity and seasonally depressed oxygen concentrations in the region of the Christiaensen Basin.

Our investigations show that sewage sludge and dredge materials account for less than 15 percent of the total oxygen demand in the bight apex, with riverine particulate and dissolved organic carbon accounting for a similar demand. Photosynthetically produced carbon makes up the majority of the oxygen demand.

MESA investigators have been studying biological indicators of contamination. Benthic invertebrates, because of their sedentary nature and continuous direct contact with sediments, have been examined extensively as indicators of coastal contamination by the National Marine Fisheries Service.

One investigation has found that most of the species found in the Apex in the late 1960's were again found in 1973 and 1974. Some 146 species were found in August 1973, compared with 136 species at the same 65 sampling stations in August 1974.

The number of individuals per station over the same 2 years has also been examined. There is an apparent decline in the number of individuals. However, this can probably be attributed to natural variability rather than to increased environmental stress. The high contaminants levels and extended flushing time of the bays south of New York City cause greatly depressed numbers and species diversity of benthic invertebrates.

However, despite the great volumes of dumped and water-borne materials settling in the apex, preliminary analyses of the benthic invertebrate data indicate that average and high densities of macrofauna are widespread. There are, however, major modifications of the benthic communities in several locations.

The confusing patterns of species diversity and number of individuals of benthic organisms in the Apex are not surprising. It is expected that the density of individuals would vary considerably over the contaminant-impacted areas. On the fringes of the impacted

areas, the generally enriched sediment might be expected to support a greater than normal population.

Moving toward the center of contamination, the population would be expected to diminish below the normally expected levels. This perhaps explains the close association of both the maximum and minimum density of individuals with the topographic depression at the head of the Hudson Shelf Valley.

Several MESA investigators have been studying fish in the New York Bight which show partial erosion of the fins. This disease, fin rot, while not unique to the bight, has been identified in five species of flatfish. Winter flounder was found to have the greatest prevalence of fin rot disease recently. These fish exhibited erosion of the anal, caudal, or dorsal fins.

While the cause of the disease has not been established, the frequency of occurrence is significantly greater inside than outside the apex. They have also reported that within the Apex, the disease is found more frequently in fishes captured over high carbon sediments, than over low carbon sediments.

Several of our investigators from the National Marine Fisheries Service have associated exoskeleton erosion and gill clogging in lobsters and crabs with sediments from the Christiaensen Basin. Further investigations have indicated that similar afflictions can be induced in healthy lobsters and crabs when held in aquaria on the order of 6 weeks using sediments from the Christiaensen Basin as substrate.

The lack of commercial-size surf clams, as well as exoskeleton erosion and gill clogging of crabs and lobsters in the Christiaensen Basin are most likely associated with the multisource contamination rather than with any particular contaminant.

Increasing use of antibiotics has contributed to improvement of human health throughout the world during the past 30 years. Some pathogenic bacteria have developed strains which are becoming increasingly resistant to the antibiotics so that larger doses have to be used for treatment of disease. Resistance to toxic heavy metals has also developed in some bacteria. Coliform bacteria having resistance to heavy metals and a broad spectrum of antibiotics have been found in the New York Bight Apex.

In early 1974, the EPA informed us that the volume of sewage sludge being dumped at the existing sewage sludge dump site was expected to triple in volume over the next few years.

As a result of that information EPA requested that we develop a program to look at these alternative dump sites.

A preliminary report of these data and evaluations, along with appropriate conclusions and recommendations concerning the suitability of the two areas, or portions of the two areas, for locating an interim alternative sewage sludge dump site, was delivered to EPA region II on August 31, 1975. This report formed the core around which their environmental impact statement on moving the existing sewage sludge dump site is based.

The results summarized in the report to EPA region II are an important factor for the NOAA recommendations to EPA on October 6, 1975, which stated that:

The sewage sludge dump site should not be relocated. The responsible public health agencies still have no evidence that the existing dump site poses a

threat to the health and well-being of people using the beaches. There is also no evidence of massive migration of dumped sewage sludge toward the beaches of Long Island or New Jersey.

Additionally, moving the dump site would not result in any significant overall improvements of the water quality of the Bight Apex because the effects of the dumped sewage sludge are masked by the larger mass emission rates of pollutants from shoreline outfalls, rivers, and embayments.

With respect to continued ocean dumping we stated to EPA that:

We urge that the dumping of sewage sludge in the New York Bight be phased out as soon as suitable land-based alternatives can be implemented. We recognize, of course, the need to examine potential alternative dump sites in the event there is a real and pressing need to cease operations at the existing dump site prior to phase-out.

Our recent investigations of the alternative dump site area were, in a sense, NOAA's contribution to preparing for such a contingency. We are in complete agreement with EPA's goal of eliminating ocean dumping by 1981.

This concludes my statement, Mr. Chairman.

Mr. MURPHY. Thank you.

Perhaps you can give us an answer to the question I asked the corps.

What is the volume of water that flows through that column of the Hudson Trench as it goes through the bight?

Commander SWANSON. I do not have the number at my fingertips.

Mr. MURPHY. Would you get that for us?

[The following was received for the record:]

#### WATER VOLUME TIDAL CHANGE

The annual average tidal change of water-volume over a tidal cycle (approximately 12-hours), for the New York Bight Apex, is 100 billion cubic feet or 748 billion gallons. This number, however, has no relationship to the tidal or non-tidal flushing of the area.

A more meaningful measure would be flushing time. Flushing time in the Apex has been calculated for both fresh water and iron inputs for comparison. The flushing time for fresh water varied from six to ten days over the year, even though river runoff varied almost ninefold. Slightly higher but consistent values were found for iron, ranging from eight to 14-days over the year.

Mr. MURPHY. I would also like to know what reaction to that movement of that water column has on the bottom normal movement.

Commander SWANSON. Could I get you to elaborate a little bit on that?

Mr. MURPHY. You have this tidal surge, going through the bight. What effect, if any, does that movement have on the movement of the bottom?

Commander SWANSON. We can perhaps provide you some information on that.

Probably the most significant factor in moving material on the bottom in the bight is the unusual events, not necessarily unusual in the fact that they do not occur, but because they do not occur periodically, perhaps.

Winter storms probably are the most effective way for moving material on the bottom and, as I stated in the testimony, we observed movement of sanr, which is far more difficult to move than the fine material on the order of 1,200 meters, on the order of 2½ to 3 days.

Mr. MURPHY. So in effect, the bight moves?

Commander SWANSON. Yes, sir.

Mr. MURPHY. Mr. Mugler, were your programs coordinated with NOAA as well as EPA?

Mr. MUGLER. Yes, they were.

Mr. MURPHY. You mention on page 4 that in the next phase of your program you will try to obtain information on specific pollutants.

What pollutants will you be looking for?

Mr. MUGLER. OK. To date we have shown information on sewage sludge, acid waste, sediment and chlorophyll. There are some additional hazardous materials that are being dumped at the 106 site that we intend to include in the program.

Mr. MURPHY. In your slide presentation you showed some instrumentation that would probably identify people who dump illegally on the way out to, say, a dumping site.

Why are not the appropriate agencies utilizing that technology?

Mr. MUGLER. Well, first I would like to comment that we, in conjunction with both NOAA and EPA, are evaluating this technology to determine its ability to monitor ocean dumping.

In the evaluation process, information is being gathered, and is being turned over to both NOAA and EPA.

EPA Region II did inform us that they have used some of this information for enforcement action, and if Pete Anderson is still here, I would like for Dr. Anderson to elaborate on that.

I guess he left.

Mr. MURPHY. How about the Coast Guard? They are the agency responsible.

Mr. MUGLER. Yes. We stay in touch with the Coast Guard.

We met with Coast Guard headquarters just about 2 months ago in Washington. They are aware of this information.

At this point in time I think that the multispectral scanning techniques have not been sufficiently verified to the point where they can be put into an operational system. Some additional evaluation and assessment is in order.

Mr. MURPHY. Is your satellite imagery useful for notifying the Coast Guard of violators, or is it just for long-term effects and movement of the bight, and the location of trace metals and other elements in the bight?

Mr. MUGLER. In my opinion, it is more suitable for the longer range studies, because with only the Landsat-1 in orbit, we passed over the same point on the surface of the Earth only once in 18 days.

Now that we have Landsat-2 in orbit we can cut that time to 9 days.

Once every 9 days is still not a very frequent interval if you are trying to conduct surveillance.

It is useful, however, to determine long-range changes in conditions.

On the other hand, occasionally you might be lucky enough to see something on the satellite imagery that can help you in the surveillance area.

Mr. MURPHY. You say on page 7 that your new coliform detection process cuts the standard technique time by a factor of three.

What are the numbers that we are talking about?

Mr. MUGLER. The standards require anywhere from 24 to 72 hours to determine the coliform concentration. So we can cut that by at least a factor of three.

Actually, we have determined some coliform levels in the order of 3 hours, but if the concentrations are low it takes up to 7 or 8 hours.

Mr. MURPHY. Would it be accurate enough to predict the closing of beaches because of unsanitary conditions?

Mr. MUGLER. We think so, but that is really the purpose of the program, a joint evaluation program, that we are conducting right now with EPA Region II.

Our coliform detector was in the bight for a 2-week field experiment the last of January and the first week of February this year, and so we are making that assessment now.

Mr. MURPHY. When will you have the remote sampling that you mentioned on page 7 in operation?

Mr. MUGLER. I am guessing now, because I cannot recall the schedule, but the next phase is to incorporate the remote antenna system, the buoy antenna system, with the coliform detector itself, and deploy it in the local areas around the research center, the Chesapeake Bay in this case, and have a joint test with region II participating.

I would estimate that would take place in the next 4 or 5 months.

Mr. MURPHY. How often do you provide photographs to EPA and NOAA?

Mr. MUGLER. EPA has a contract with the Goddard Space Flight Center to provide them with remote imagery. That is a continuing process.

With NOAA, I do not know if they also have such a contract, but we are in continuous touch with NOAA scientists.

We have active, cooperative programs with the National Environmental Satellite Service, the arm of NOAA that deals primarily in the remote sensing aspects, and with the MESA New York Bight project officer.

Mr. MURPHY. Commander Swanson, if the level of sewage sludge dumping increased three or four times, would you recommend that dumping take place in the same place used now or be sent to other areas, or what would you do with it?

Commander SWANSON. We made the recommendation to leave it at the existing site.

Mr. MURPHY. How would you characterize the apex of the New York Bight today? Would you call it a dead sea?

Commander SWANSON. No, sir, I would not. I would say it was seriously degraded.

Mr. MURPHY. What is the difference between a dead sea and something that is seriously degraded?

Commander SWANSON. If it were dead, I think we would not be looking for an opportunity to have it recovered. It would be beyond help.

Mr. MURPHY. I see where NOAA recommended and EPA concurred that the present sewage dump site in the bight should not be moved. This is to avoid contaminating an area that is now pristine.

In the press release announcing his recommendation, Regional Administrator Hansler, who testified this morning, justified his decision, in part, on the grounds that continued dumping of present volumes would have no additional significant effect on this site.

What would be the effect on the site?

He said it would have no effect on the site, which indicates to us that it is not going to hurt it any more than it has already been hurt.

Commander SWANSON. The existing site you are talking about?

Mr. MURPHY. Yes.

Commander SWANSON. Our contention is other contaminant sources are so significant that even tripling the volume of sludge material going out there will probably not have significant additional impact on the existing area.

Mr. MURPHY. You seem to disagree with Mr. Mugler that the bight is traveling.

His photography and scanners indicate a movement northward of the bight, and you feel there is no significant movement northward.

Commander SWANSON. I think, to my knowledge, there is no portion of the ocean that does not have some sort of motion in it. The ocean is a dynamic system.

There is also a distinction between, I think, what Mr. Mugler has shown you and some of the questions we tried to resolve. What he was showing you was surface imagery. What I was addressing was the question of whether sewage sludge is creeping along the bottom, which has been the contention by many people, that it was actually moving along the bottom toward the Long Island beaches. They are two completely different problems.

Mr. MURPHY. Counsel.

Mr. SMITH. Thank you, Mr. Chairman. Commander, how much has been spent for the MESA bight project within NOAA for research activities?

Commander SWANSON. Directed toward ocean dumping?

Mr. SMITH. No. Directed toward all the monitoring you have been doing within the bight.

Commander SWANSON. Can I supply that for the record?

Mr. SMITH. Well, actually, what I am trying to establish is, do you have a comparison, just in general figures, of what has been spent for monitoring activities within NOAA and what has been spent for looking to alternative sources of disposal, land alternatives, for instance, and other alternatives?

Commander SWANSON. To my knowledge, NOAA has not been looking at alternatives to ocean dumping. Our project specifically has not. That is not our charge.

Mr. SMITH. Last week, when we had Dr. Townsend before the subcommittee, we asked him how much NOAA was spending and how much priority they were giving to looking toward alternatives.

Dr. Townsend stated that he did not feel NOAA had the expertise or the competence to get into the research into alternative methods of dumping. And he deferred to EPA for that.

Do you agree that NOAA does not have the competence and expertise to carry out these research efforts?

Commander SWANSON. From the areas of NOAA that I am familiar with, I would say that is probably correct.

Mr. SMITH. One final question.

How many dredge spoil dump sites has NOAA conducted monitoring activities upon in the New York Bight area?

Commander SWANSON. Specifically, we have tried to look at the sewage sludge site, not the dredge spoil sites. We have a data base that covers the entire bight apex, which includes the dredge spoil site. That contributes a rather significant baseline of information for detailed investigation of the dredge spoil site.

But we have not specifically gone out to the dredge spoil site other than to look at the bathymetry, the change in bathymetry. We have not gone out specifically with the intention of looking at that dredge spoil site yet.

Mr. SMITH. Do you agree with the corps' contention that most dredge spoils do not have any harmful effect on the marine environment if they are dumped in the ocean?

Commander SWANSON. I think it is a matter of priorities in scheduled quite in that manner. I think dredge spoil, like anything put into the ocean, whether it has a detrimental effect or not depends upon the specific material.

Mr. SMITH. But nobody is studying this?

No one seems to be monitoring what the dredge material is doing. The corps is not focusing in on this in the New York bight, neither is NOAA, and both of you have responsibilities under the law to do this.

If this is the greatest amount of material that is dumped in this area, I am wondering who is taking on that responsibility.

Commander SWANSON. I think it is a matter of priorities in scheduling.

As you are probably aware, the sewage sludge issue in the last several years has been foremost in everybody's minds, and that was the extremely high priority thing for us to address with the resources that we had.

Now that I think we have a reasonable handle on what sewage sludge is doing in the bight, our next step is to look in more detail at what is going on in the dredge spoil dump site, and that is certainly our intention.

But I would like to point out again the sludge issue was the one that was raised as the primary issue, and we are finding out a lot of information about other dumping problems as we go along with the sludge issue.

Mr. SMITH. Thank you Commander. Thank you, Mr. Chairman.

Mr. MURPHY. Thank you very much, Commander Swanson and Mr. Mugler. We appreciate your time and your testimony.

The next witness is Henry C. Sandkuhl, Energy Systems, Inc.

Mr. Sandkuhl.

#### **STATEMENT OF HENRY C. SANDKUHL, VICE PRESIDENT, FINANCE, ENERGY SYSTEMS, INC.**

Mr. SANDKUHL. We have been talking pretty much about sludge dumping and the overall picture which took in industrial sludge as well as municipal sludge.

Six years ago, my company built, I believe it was the first, nuclear sewage treatment plant in the world for Lykes Brothers down in

Florida. Since that time, we have concentrated on the approach for the treatment of sludge, particularly municipal sludge.

I have had a number of meetings with various municipalities, particularly in New Jersey along the coast, because they were having the problem of having to pay for barging.

I met specifically with the Middletown sewage authorities for the past 2 years. They became very interested in overcoming the problem of barging if we could do something with that sludge. We proved to them that that sludge could be treated within a radiator, using either cobalt 60 or cesium 137, and that the end product, the effluent, could be used as a soil conditioner and/or fertilizer.

I brought my nuclear physicist over here to EPA, I believe 11½ years, 2 years ago, and met with several of the gentlemen here and spent several hours here.

I found out that the price that the authority is paying for barging at the present limit for Middletown, I believe, is \$40,000 a year. Once the limit is moved out to the second limit, the increase in the barging will be \$70,000 a year. As the third limit, I believe he mentioned \$100,000 a year.

Now, to install a radiator plant for the treatment of sludge, the price of a plant depends on the amount of curies of cobalt and/or cesium needed.

I got together with the Sulzer Brothers who built the first gamma radiation plant for the treatment of sludge in Geiselbullach, Germany, 3 years ago. I have been to that plant three times.

A year ago this month, there was an International Atomic Energy Agency Symposium in Munich, Germany. I believe there were about 200 scientists from all over the world, including our own from EPA. And at that time the AEC attending that meeting.

We discussed a number of the aspects of the treatment of sludge. That was the specific reason for that meeting.

A half a day of that week-long symposium we took off and visited the plantsite of this sludge plant. This plant has been operating 3 years this month without a breakdown.

The way they run the sludge through the sludge plant and the actual physical size of the plant is about half the size of this room as far as the square footage, and about 30 feet high. So it does not take up too much room.

The radiator itself, if it is rectangular, it is about half the size of this table. If it is circular, it is like the model over here I have; which is a working model, and I demonstrated that a couple of weeks ago down in Red Bank to several of the authorities.

At the present time, Cobalt runs about 35 to 50 cents a curie. That is about the most expensive part of the installation as a single item.

For the treatment of about 450,000 gallons of sludge, which the Middletown Sewage Authority has every 5 weeks, they would need about 150,000 curies of cobalt, costing approximately \$70,000 to \$75,000.

I have been to Trenton.

Mr. MURPHY. Would you give me those figures again, please?

Mr. SANDKUHL. Yes, sir.



The curies of cobalt run about 45 to 50 cents a curie. To treat 450,000 gallons of sludge every 5 weeks, which is what they do have at present at the Middletown Authority, that requirement would be 150,000 curies of cobalt.

I have been working very closely with Mr. Savinsky out at the sanitary laboratories in Albuquerque, and I have discussed and met with Dr. Farrell at the Research Division of EPA in Cincinnati. He has offered a grant for the first sludge plant that we put up in this country for the monitoring and the instrumentation over a period of 3 years at the rate of \$60,000 a year. He also suggested that I go to Washington to try to get a sociological grant to try to alleviate any fear of radiation within a given area where we might be interested in putting a plant.

Mr. MURPHY. That would mean Middletown would spend \$7.5 million a year using your process?

Mr. SANDKUHL. No, sir.

The whole plant, covering 450,000 gallons a month, including all the equipment, the concrete work, would approximately be a million to a million and a quarter. Of that cost, about \$75,000 would be the cost of the cobalt.

Mr. MURPHY. You said 150,000 curies of cobalt.

Mr. SANDKUHL. At 45 to 50 cent per curie.

Mr. MURPHY. That is \$75,000 every 5 weeks.

Mr. SANDKUHL. No, no. That cobalt has a half life of 5 years and 2 months.

Mr. MURPHY. So that would be \$750,000?

Mr. SANDKUHL. Cesium, I believe, has a half life of about 30 years.

There is no plant in the world using cesium yet. But the government told me a year ago that they believed they would have enough cesium for the first plant that we installed, that we possibly could get it given to us by the Sandy Laboratories.

What might be interesting here is the fact that the problem does not seem to be with the Federal moneys, which is 75 percent. In the State of New York, I believe it is 12½ percent State and 12½ percent municipal.

In the State of New Jersey, it is 15 percent State and 10 percent municipal.

The main problem is the 10 percent. I tried to work with them in this respect.

It is a fact that the State buys fertilizer to treat the parkways and grass, as well as private companies owning golf courses, and here was an end product that was available to save the State money for their parkways by having a natural soil conditioner to use on the grasslands as well as the municipalities in their parks, and at the same time we would eliminate the cost for the municipality that used municipal sludge.

This is not a theory. This has been working for 3 years.

Mr. MURPHY. Did you make a statistical study to present to EPA when you met with them here as to the cost-benefit ratio of your process in comparison with the standard process in use now?

Mr. SANDKUHL. Well, at the time I met with them, we did not have all the answers as to the cost.

Mr. MURPHY. Would you provide it for this record then?

Mr. SANDKUHL. I would like to, sir.

Mr. MURPHY. All right.

Mr. SANDKUHL. I do know that the approximate price of chlorine has gone up to about \$170 a ton. I do not know how much chlorine is used over a period of years as a comparative basis, but I would believe there are only about five suppliers of cobalt and/or cesium.

General Electric is one. ERDA today is one. The Atomic Energy Commission of Canada is one, and two smaller companies in this hemisphere.

So it is rather limited. But there is a vast supply of cobalt, and they have told me, Dr. Ballentine at the ERDA in Washington, that once we started to use cobalt in quantity, he believes the price would be a lot cheaper because the reactors could produce all the cobalt that we need.

Mr. MURPHY. There is a lot of cobalt in the ocean bottom.

Mr. SANDKUHL. That is true, sir.

Not only does this system of using radiation kill the bacteria and viruses, but with the help of the Florida Institute of Technology, we did a lot of laboratory work, and we checked on specific viruses that might have to do with such as the hepatitis in clams, in clam beds, and we do know that it does kill both the species virus of that species of hepatitis as well as polio and influenza.

I believe there is a vast amount of viruses, but as many as we have tested, it has actually killed all the viruses.

Now, depending upon the amount of cobalt used in a radiator, we have found in the plant that we built in Florida that we not only kill the virus in bacteria, but we degrade the deterrents and we inhibit the growth of algae.

By stating such, I mean that we can recycle this water back into the stream.

There was quite an interest from the Mideast countries that had arid land about this system, and I have a list of about 30 applicants that would like to attend the official dedication of the first plant that we built here in this country, and I hope that will be shortly.

I met with the county commissioner of Monmouth County the week after I held the meeting, and he suggested that I point at a different plant because of the particular money problems that this one plant in Middletown was having. So he has asked me a number of questions to submit to him. There is the cost of the concrete, the cost of the excavation. I am not qualified to give that. I have to go to some contractor to get this information. But I do have a serious interest in California as well as in New Jersey for the use of this system.

Mr. MURPHY. Counsel.

[No response.]

Mr. MURPHY. Mr. Sandkuhl, if you would give us that statistical study, we are also going to check on the Sulzer project in Germany.

It was Lykes Bros. in Louisiana?

Mr. SANDKUHL. Lykes Bros. in Florida.

I have a complete report from the Sulzer Bros., as well as a picture of the plant that was built for the municipality. I would like to leave this for you.

Mr. MURPHY. Give it to the Clerk.

Mr. SANDKUHL. They are working very closely with me. They have given me a proposal for the plant in New Jersey, as far as the engineering and the designing of the plant.

Mr. MURPHY. Thank you, Mr. Sandkuhl. We appreciate it. Anyone else?

### STATEMENT OF REUBEN R. GORDON

Mr. GORDON. Is this open to anyone of the public who wishes to speak?

Mr. MURPHY. It is a public hearing.

Please take the witness chair and identify yourself.

Mr. GORDON. All right.

My name is Reuben Gordon. I am a member of the Americans for Democratic Action and other civil interest organizations.

I was not aware of this meeting perhaps because it has not been sufficiently well publicized.

I know it is of great importance, but I am aware of the fact that certain criminal organizations are interested in the general problem of disposal of sanitation products and materials.

In fact, I have attended the trial for awhile of Mr. Nicholas, to his friends "Cockeye," Ricevinni, who is head of the garbage disposal rackets up in Westchester, and apparently somebody took exception to my interest in attending his trial. I was banned from further attendance at his trial by Federal guards.

Now, I am giving you my credentials for talking about the influence of organized crime in this entire area of garbage disposal.

Now, I am counting on my recollection. I know very well that the newspapers carried some information about some tremendous fill or garbage that was disposed of somewhere inside of New York Harbor, I believe.

Now, who permitted that, I do not know. All I know is that the facts came out in the newspapers, and nobody seemed to follow it up.

My understanding is that it is a violation of Federal regulations and that it is the responsibility of the Army Corps of Engineers to supervise operations of that nature.

Now, the details of this business of sludge being used for purposes of fertilizer, I believe, from listening to some previous gentleman who spoke, and apparently with authority, I am merely a layman on the subject, it seems quite possible that the Germans have developed a use of waste materials for fertilizer. In fact, there are quite a number of processes which the Germans developed and which could easily be applied.

But, in my own understanding, because of the nature of the multinational corporations who have connections with the organized crime syndicates, and that is quite obvious from the fact that when citizens try to file complaints about the organized crime penetration into various Federal agencies, they use the armed guards. I can attest to that personally.

In fact, I was arrested this morning when I tried to get copies of this criminal intelligence involving Federal judges and U.S. attor-

neys who apparently are acting as arms of the Mafia in the narcotics business.

So, although there may not seem to be any direct application to the subject, the narrow subject with which you are seized, I believe I have plenty of documentation for the fact that in any problem which involves disposal of waste, such as is apparently before you, the Mafia will take a very great interest.

I know, for example, that the Sanitation Department of New York City is now controlled by someone who formerly was on the staff.

Mr. MURPHY. If I could interrupt you just a minute.

The U.S. attorney for this district is right across the street, and if you have any allegations about the criminality, that is where you should make those remarks and that presentation, or you could go to the Judiciary Committees of the Congress.

What this hearing is is an evidentiary hearing that concerns itself not only with the New York Bight, but with ocean dumping as a general subject on a national basis so that we can revise the Ocean Dumping Act.

Mr. GORDON. Would you have a copy of that Ocean Dumping Act available?

Mr. MURPHY. Counsel has a copy.

Mr. GORDON. Do you plan to have any further hearings?

Mr. MURPHY. This committee is going to reconvene at 10 o'clock Monday morning in Washington.

Mr. GORDON. If you give me copies of some of that material, and if somebody will pay my fare to Washington, I believe I will give you a very informed opinion about it, and I will tie in the organized crime.

Mr. MURPHY. Congress has a practice of paying no one's fare to a public hearing, whether it be in Washington or New York.

Mr. GORDON. I have not checked my summons as to when I have to appear in court. You see, that has been one of the problems.

Mr. MURPHY. We will provide you with a copy of the act. We appreciate your testimony.

Mr. GORDON. Do you recall when I last testified before you, Congressman?

Mr. MURPHY. When was that?

Mr. GORDON. That was a number of years ago at the Customs House when my own Congressman—I do not remember his name, because he has been in jail so long. We were testifying on the rating of bonds and, you see, New York City has since gotten into quite a mess with the bonds.

I am sure you will remember it because you were sitting there with him.

Mr. MURPHY. Right in this room.

Mr. GORDON. What was the name of the other Congressman? It is the Freudian's block when I have been harassed and hounded to the extent that I have been.

Mr. MURPHY. Counsel has given you a copy of the law.

Mr. GORDON. Yes.

Mr. MURPHY. We are going to adjourn, and if you would direct any comments on the law to the committee, that is on ocean dump-

ing, we would appreciate it. But the other comments, I think, are relevant to the U.S. attorney and not to this hearing.

Mr. GORDON. I do not see any reason why you should not bring it to the attention of the U.S. attorney.

Mr. MURPHY. I do not have the knowledge that you do of the incidents that you are talking about.

Mr. GORDON. It was in the public press.

Mr. MURPHY. Well, then, it is the responsibility of the Attorney General to take it from the public press.

Mr. GORDON. But, you see, the Attorney Generals are political appointees who get their jobs from the leaders. You know, nobody becomes a U.S. attorney without being approved by either Vince Alvicano or Espiatio.

Mr. MURPHY. The U.S. attorneys are appointed by the President of the United States.

I am going to ask you to suspend at this point while the Chair makes a concluding statement.

Mr. GORDON. Could I offer you this and place it in evidence?

You see, my problem is that I cannot get to the U.S. attorneys. They use the Mafia tactics. I would be assaulted by Federal Marshals, so I am prevented from giving information.

I happen to know that is a violation of Federal law.

Mr. MURPHY. Would you give that to the clerk?

Mr. GORDON. I have enough copies for you gentlemen up there.

My own opinion is that the Bar is the greatest threat to the security of the United States, the greatest criminal conspiracy, and many of the people in Congress, as you know, are members of the Bar. You have the same responsibility that I have to report criminal intelligence to the President of the United States, the Chief Executive.

I do not see why I should be hounded, harassed, threatened, arrested.

I do not get paid for that.

Mr. MURPHY. The committee appreciates your testimony.

As a result of today's and previous hearings, I have come to several conclusions that will affect the future actions of these combined committees of Congress:

Because of the shortsighted two-fisted policies of the administration and the Office of Management and Budget, the anti-ocean dumping program has been a flop—especially off the coast of New York. Four years after Congress passed the act, a whole new section of the Bight has been declared out of bounds for shell fishermen.

The Environmental Protection Agency, which was supposed to restrict dumping through the issuance of permits based on health and environmental concerns, has actually turned into a dispenser of "licenses to dump" with such considerations being incomplete and incompetent.

The National Oceanic and Atmospheric Administration, NOAA, has failed to develop the alternatives to ocean dumping that were expected when the act was written.

In conclusion, I feel the administration's handling of this law—mandated by the Congress—is a national disgrace. I will, therefore, urge that these two committees report to the floor of the Congress a

bill that will provide the funds and the legislative language that will force a cessation of all ocean dumping and provide alternative plans by the end of this decade.

The committee will not stand by and watch the administration turn this law into the monstrous abortion they have made it thus far.

This committee will stand adjourned until 10 o'clock Monday morning.

[The following was submitted for the record:]

UNIVERSITY OF DELAWARE,  
Newark, Del., January 14, 1976.

Hon. ROBERT L. LEGGETT,

*Chairman, Subcommittee on Fisheries and Wildlife Conservation and the Environment, House Merchant Marine & Fisheries, Longworth House Office Building, Washington, D.C.*

Hon. JOHN M. MURPHY,

*Chairman, Subcommittee on Oceanography, House Merchant Marine & Fisheries, Longworth House Office Building, Washington, D.C.*

DEAR REPRESENTATIVES LEGGETT AND MURPHY: Thank you for inviting me to testify on ocean dumping on January 22, 23, or 26, 1976. I have reviewed the testimony which you attached from previous hearings, considered the suggested questions which you attached, and discussed these with several individuals who are more active in ocean dumping activities than I am. My conclusion is that I do not have enough new information to make my personal testimony worth the valuable time of your committee. Accordingly I propose to respond by this letter to the questions on which I can make some contributions.

My principal familiarity is with ocean dumping in the upper mid-Atlantic and specifically those activities originating in the Delaware Valley. In the case of the duPont Company and its dumping of iron acid waste from the Edgemoor Plant I see them taking positive and logical action to both understand the effects of ocean dumping and to reduce or eliminate the need to dump in the ocean.

The City of Philadelphia, on the other hand, presents a greater problem in that their levels of sewage treatment are still inadequate and their arrangements for alternative means of disposal do not seem to be taking the shape of positive action plans. In this case there does not seem to be adequate enforcement of the requirement of the ocean dumping act to achieve its objectives.

I will be pleased to meet with your committees if you wish me to discuss this further.

Sincerely yours,

W. S. GAITHER,  
Dean.

IOT CORP.,  
Philadelphia, Pa., February 17, 1976.

Re Current Hearings of the Oceanographic and Fisheries Subcommittees.

Representatives LEGGETT and MURPHY,  
House of Representatives,  
Washington, D.C.

GENTLEMEN: In keeping with our strong interest in uses of the oceans contiguous to the United States we wish to present a statement to the subcommittees now hearing testimony on relative matters. In past years our coastwise marine transportation activities have involved us in offshore disposal of various materials considered to be dangerous to the inshore environment. One such material is sewage sludge. Our barge equipment was active for a period of five years in transporting and disposing at sea of sewage with no apparent harm to the environment. Our efforts led to a viable economic alternative for sludge disposal which we feel merits careful consideration for continuance by

the Congress and the Environmental Protection Agency. We offer the following statement in support of our view.

Sincerely,

ADRIAN S. HOOPER.

Attachment.

**A STATEMENT IN SUPPORT OF DISPERSED OCEAN DUMPING OF DIGESTED  
SEWAGE SLUDGE**

**GENTLEMEN:** We wish to extend to the subcommittee our statement in favor of continuing disposal of treated sewage sludge in the oceans. We are of the opinion that ocean disposal offers the most cost-effective and scientifically secure method available to financially distressed coastal cities for sludge removal.

There appears to be a great need for urban area sewage treatment improvement with inclusion of areas not now served. In keeping with and in support of all environmental concerns for achieving an acceptable level of stream and near-shore water purity, we strongly suggest that the treated end-product of this effort can and must find its way back into our eco-system in a practical, economical manner.

Our efforts in this field indicate that modern plant materials handling and marine transportation systems are current state-of-the-art means for the acceptable disposal of sludge under environmentally controlled conditions. We suggest that alternate deep water siting and adequate dispersal produces no perceptible damage to the ocean. Scientific support for this method of disposal exists and should become a part of the approved technique. Alternative proposals are far more expensive and their environmental advantage has not been demonstrated.

Again, we are deeply committed in support of continuing ocean disposal of treated sewage sludge.

ADRIAN S. HOOPER.

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NATIONAL FISHERIES INSTITUTE, INC.,  
Washington, D.C., January 23, 1976

Hon. ROBERT L. LEGGETT,

Hon. JOHN M. MURPHY,

*c/o Subcommittee on Fisheries and Wildlife Conservation and the Environment,  
Washington, D.C.*

**GENTLEMEN:** The National Fisheries Institute is pleased to make the following comments with regard to the administration of the Marine Protection, Research, and Sanctuaries Act of 1972, Public Law 92-532 by the Environmental Protection Agency and where appropriate by the Corps of Engineers and the National Oceanic and Atmospheric Administration. In addition, please find enclosed copies of correspondence between the Institute and Administrator Train setting forth NFI's concerns regarding the administration of Title I of the Act.

As indicated in our letter of September 15, 1975, the Institute is troubled by the low level of funding requested during Fiscal Year 1976 by EPA for programs under the Act. While I have not yet had an opportunity to review the level of funding requested by the President for these programs for Fiscal Year 1977, prior experience warrants concern with the proposed level of funding. While NFI is aware of the need for fiscal restraint, the provisions of the Budget Reform Legislation enacted in 1974 clearly indicate the intent of Congress to become an active participant in decisions concerning Government spending.

This Joint Subcommittee's involvement in the decision making process is illustrated by Public Law 94-62 which was reported from this Joint Subcommittee last year and which authorized a funding level of \$5.3 million for Fiscal Year 1976. The Institute is in accord with the determination of this Subcommittee as expressed in House Report 94-217 that increased funding will be necessary if EPA is to carry on an adequate program of scientific evaluation of dump sites and waste materials. For this reason, we urge this Subcommittee to carefully evaluate the funding request submitted by the Adminis-

tration and approve an authorization measure which will provide all agencies and departments with adequate authority to carry out an effective program under this Act.

This need for a proper level of funding is evident by Administrator Train's discussion of his recent decision upholding the action of Region III of EPA which required the City of Philadelphia to phase out ocean dumping of sewage sludge by 1981. In his letter to NFI, he indicated that he shares the prevalent concern in the scientific community regarding the continued addition of heavy metals and other pollutants to the ocean. Mr. Train goes on to support an EPA panel's findings:

"The scientific evidence surrounding this particular permit application can only be described as preliminary and, as indicated by the testimony at the hearing, is certainly subject to differing interpretations. To focus solely on whether the data show that a particular organisms at the dump site has suffered adverse effects from the City's dumping activities is, in my view, to take an unnecessarily narrow view of the criteria established by Section 102 of the Act. Particularly where we are dealing with the constantly moving, constantly interchanging constituents of the ocean environment, we must take a broader view of what causes harm to that system."

The Institute is encouraged by Mr. Train's adoption of his panel's finds but cautions this committee that the broader view espoused by Mr. Train with regard to Section 102 of the Act cannot be operative unless a proper level of funding is available to permit the Administrator to make a determination that dumping will degrade or endanger human health or the marine environment.

In conclusion, the National Fisheries Institute recognizes the progress that has been made since the enactment of this legislation over three years ago and believes that recent decisions by Administrator Train provide a basis for increased protection for the marine environment through the effective administration of this legislation. However, we are concerned that progress under this legislation may be impeded by fiscal limitations and we urge this Committee to seriously consider and then enact legislation containing a proper funding level for programs set forth in the Marine Protection, Research and Sanctuaries Act of 1972.

Sincerely,

GUSTAVE FRITSCHIE,  
*Director, Government Relations.*

[Whereupon, at 4:30 p.m., the subcommittees adjourned, to reconvene at 10 a.m., Monday, March 8, 1976.]

